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USAFOEHL REPORT

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WASTEWATER CHARACTERIZATION SURVEY VICTOR VALLEY, WASTEWATER RECLAMATION AUTHORITY AND HAZARDOUS WASTE SURVEY AT GEORGE AFB CA

ROBERT D. BINOVI, LT COL, USAF, BSC
ELLIOT K. NG, MAJ, USAF, BSC
ROBERT A. TETLA, 1LT, USAF, BSC

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Final Report

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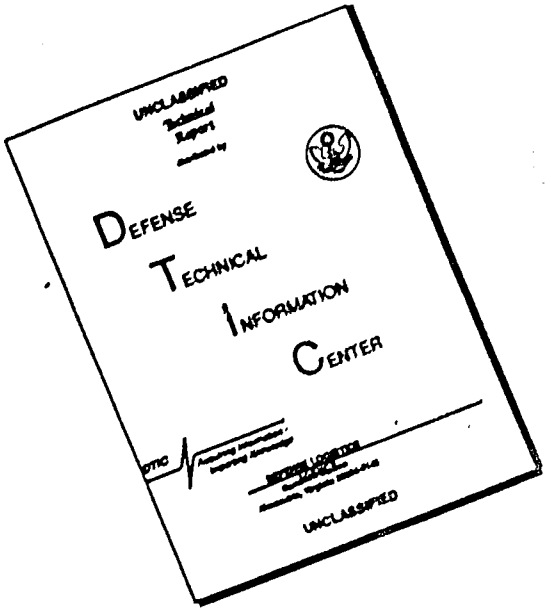

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This report has been reviewed and is approved for publication.

JOHN J. COUGHLIN, Colonel, USAF, BSC
Commander

Prepared By:

ROBERT D. BINOVI, Lt Col, USAF, BSC
Chief, Water Quality Function

ELLIOT K. NG, Maj, USAF, BSC
Chief, Hazardous Waste Function

ROBERT A. TETLA, 1Lt, USAF, BSC
Hazardous Waste Function

Reviewed By:

MARLIN L. SWEIGART, Lt Col, USAF, BSC
Chief Environmental Quality Branch

DARRYL T. MARKLAND, Colonel, USAF, BSC
Chief, Consultant Services Division

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19. ABSTRACT (Continue on reverse if necessary and identify by block number)

The USAFOEHL conducted a survey of the Victor Wastewater Reclamation Authority Sewerage system, the sewage treatment plant, and effluent from the various operations at George AFB, at the request of George AFB Commander. The scope of work included the characterization of the wastewater from George AFB, as well as the communities of Apple Valley, Victorville, Spring Valley Lake, Hesperia, Oro Grande and Adelanto. Also included was the characterization of effluents from 29 oil/water separators servicing industrial operations on base, flow measurements at three locations on base, a microbiological evaluation of aeration basin foam, bench scale activated sludge studies, and a review of results from previous surveys. A comprehensive hazardous waste survey was conducted. Collection, storage, disposal practices, and storage points were surveyed.

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Item 19 continued

The base effluent was found to exceed VVWRA discharge limitations for MBAS, oils and grease, sulfides, and chlorinated hydrocarbons. All the organic halocarbons, as measured by the TOX test, coming into the VVWRA plant, came from George AFB. Detergents used at George AFB are biodegradable, however, the surfactant used in Aqueous Film Forming Foam is apparently not.

Recommendations: (1) AFFF should never be discharged to the sewer. (2) Programming for pretreatment should proceed at selected operations. (3) more waste and wastestream analysis be performed. (4) upgrade waste accumulation points. (5) implement an aggressive inspection program for oil/water separators. (6) Cut down on nonessential washing.

Keywords: Hazardous waste; pretreatment; Air Force facilities

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I. INTRODUCTION

HQ TAC/SGPB requested the USAF Occupational and Environmental Health Laboratory (USAFOEHL) provide consultation to the George AFB Commander. A foaming problem occurring at the Victor Valley Wastewater Reclamation Authority (VVWRA) treatment plant was reportedly caused by industrial discharge from operations at George AFB. Major Robert D. Binovi, Chief of the Water Quality Function, Consultant Services Division, was appointed consultant for the project.

On 7 August 1986, Major Binovi and Col Gerry Volloy, George AFB Commander, met with the VVWRA. Col Volloy reiterated that the base would cooperate with the VVWRA, respond to their questions, and take aggressive action to demonstrate the base intention to investigate the immediate foaming problem and provide long-term solutions to VVWRA concerns. As part of this action the USAFOEHL would conduct a wastewater characterization and hazardous waste survey.

The scope of work of this survey included the characterization of the wastewater from George AFB, as well as the communities of Apple Valley, Victorville, Spring Valley Lake, Hesperia, Oro Grande and Adelanto. Also included was the characterization of effluents from 29 oil/water separators servicing industrial operations on base, flow measurements at two aircraft washracks and at a building housing industrial operations, a microbiological evaluation of the foam from the aeration basins, bench-scale activated sludge studies of two industrial effluents, and a review of previously performed analytical data.

The wastewater survey was conducted by Major Robert D. Binovi, Capt Guy T. Fagin, 1Lt Francis E. Slavich, 2Lt Charles W. Attebery, MSgt Horace C. Burbage, SSgt Mary M. Fields, SrA Ross W. Simmons and A1C Robert P. Davis. The hazardous waste survey was conducted by Major Elliot K. Ng and 1Lt Robert A. Tetla. The surveys were conducted from 13 Aug through 5 Sep 86. Mr Arturo Riojas and Dr Ralph Rascati assisted at USAFOEHL.

II. BACKGROUND

A. Introduction

George AFB, the home of the 35th Tactical Fighter wing, is located in Victorville, a developing area on the southern edge of the California Mojave Desert. The base is a busy one, supporting tactical fighter and fighter training missions. Base working population at the time of the survey was approximately 5450 military and 1000 civilians. Approximately 11,000 people live on base.

The climate at George AFB is arid, which is typical of the Mojave Desert. The summers are extended in duration and are hot with an average temperature of 96 degrees in July; the winters are short and cool with an average temperature of 45 degrees in January. The annual precipitation for

the area is 4.1 inches. During the time of the survey the average daily temperature was 80 degrees and 0.15 inches of rain fell on 18 August with a trace on 26 August.

Industrial operations on base include facility, aircraft, and vehicle maintenance. Industrial wastewater is combined with domestic waste which flows to the Victor Valley Wastewater Reclamation Authority regional activated sludge wastewater treatment plant through two metering stations, George 1 and George 2. George interceptor 1 services most industrial operations. The George 2 interceptor services the family housing units and the hospital.

The VVWRA treatment plant, located approximately 1 mile northeast of George AFB, collects, treats and disposes of approximately 3.7 (MGD) of domestic wastewater. During 1985, approximately 0.7 MGD of treated wastewater was discarded to percolation ponds and the remaining 3.0 MGD was discharged to the Mohave River. Treatment processes consist of screening, grit removal, primary sedimentation, biological treatment using activated sludge, secondary sedimentation, pressure filtration and chlorination. (1)

The plant has experienced foaming and bulking to some degree since it became operational in December 1981 (See Figure 1). Severe foaming occurred during the summer of 1986. The plant general manager was convinced that the foaming was caused by the industrial discharge from operations at George AFB. The VVWRA was considering issuing a cease and desist order to prevent the base from discharging industrial wastewater to the plant.

B. George AFB Previous Surveys

Several wastewater characterization studies have been conducted at the base. The 1980 Stone Report (2), 1980 USAFOEHL Study (3), the December 85 study conducted by the base (4) and the Jenkins and Associates study (5) are summarized here.

1. The Stone Report is actually two reports, "Draft Industrial Wastewater Survey, George AFB, California," and "Concept Design Report for Industrial Waste Collector Main at George AFB, California". The sample analyses of the former report revealed that sulfides exceeded the 1978 and 1983 effluent discharge requirements of the VVWRA. The Stone Report concluded that the metals, cadmium, mercury, silver, and selenium exceeded the 1978 mass emission limits at the average design flow of 0.8 MGD. Zinc equaled the 1978 mass emission limits. Although the quantity of oil and grease in the composited sample was below effluent limits, provisions to remove an accidental spill of oil and grease or other flammable substances were made in the concept design facilities. Oils and grease, chlorinated hydrocarbons, trichloroethylene, methylene chloride, cresols, and trihalomethanes were not detected in the composite sample. Measurements and samples were taken from a perforated industrial waste/storm water sewer outlet servicing 15 industrial facilities (Bldgs. 14, 18, 555, 559, 563, 568, 652, 676, 681, 682, 685, 686, 696, 706, 743).

Figure 1: Severe Foaming at WWRA Treatment Plant

The reports were never finalized because they erroneously used industrial effluent concentrations in the mass emission rate calculations instead of concentrations in the combined effluent. This is of no consequence at the present time since the current discharge limits are based on concentration not on a mass basis; however, sulfides were still over the concentration limit of 0.5 mg/l. The heavy metals concentrations were below the limitations based on concentration.

The recommendations of the Stone Report (draft) were:

a. Aeration treatment will be required to reduce sulfides to compliance levels.

b. Chemical treatment by alum may be required to remove heavy metals.

c. Facilities for gravity oil/water separation should be provided in the existing oily water tank.

d. Facilities for settling of oxidized and or settling chemically precipitated metals and flotation of de-emulsified oils and grease should be provided after aeration.

e. A flow equalization basin is recommended as a way of controlling the highly variable flows into the treatment facility.

f. Covered and evacuated facilities are needed to remove the presence of volatile explosive hydrocarbons.

g. Pilot tests for unit treatment processes should be performed under actual flow conditions.

2. The 1980 USAFOEHL study recommended industrial wastewaters pass through oil-water separators prior to discharge into the sanitary system. On three of the seven sampling days, the concentration of boron in the influent to the old George AFB sewage treatment plant exceeded the existing limitations established by VVWRA. No limitations had been set for surfactants, therefore, surfactant concentrations were not measured.

3. The 1985 study conducted by the base titled "The Certified Testing Laboratories, Inc., Wastewater Sampling Data, DGC 3- Dec 20, 1985" monitored base effluents over a 16 day period. The base assisted a contractor in monitoring 11 locations along the industrial main, at GAFB 1, and at the inlet to the plant. Lt Fleck, summarizing the data in a cover letter to HQ TAC/SGPB (4) compared the concentrations of oils and grease, phenols, CTAS, MBAS, and purgeable halocarbons and aromatics from the base with the concentrations into the plant. He concluded that the effluent from the base does not appear sufficiently concentrated in toxic organics, oils and grease, or surfactants to cause problems to a well designed sewage treatment plant. Unfortunately, Fleck did not consider mass loading in his calculations or the volatility of the organic chemicals.

4. Jenkins and Associates (5) looked at the foaming problems of the plant and its relation to the plant not meeting effluent standards for turbidity. He stated that one aeration basin was taken off line and served as a "preaeration" basin since August 1985. In this mode white foam has developed as well as brown foam in the remaining two aeration cells (See Figure 2).

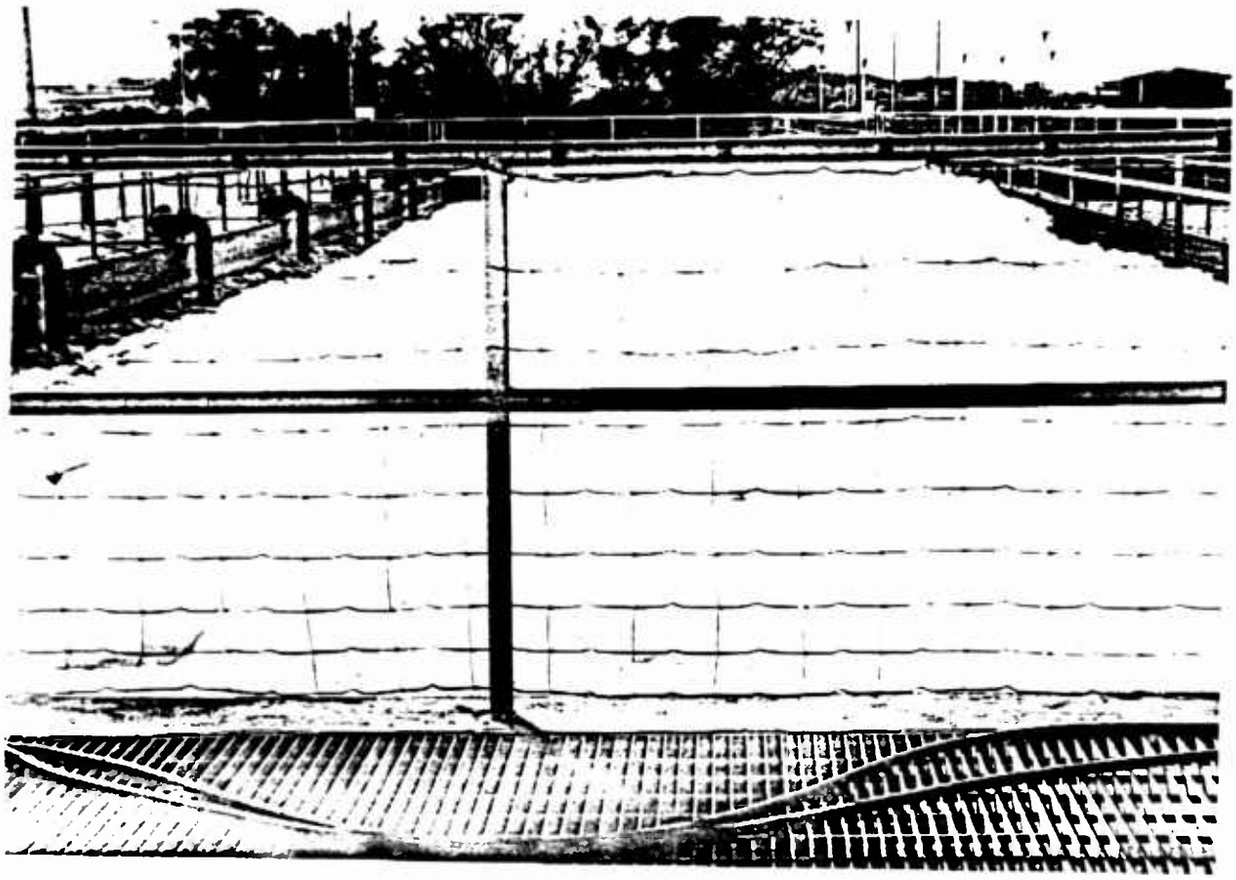


Figure 2: White Foam in Preaeration Tank, 2 Sep 86

The presence of foaming agents has been indicated by the use of an "Alka Seltzer Test" in which two Alka Seltzer tablets are dropped into the wastewater and the amount of foam measured. The white foam produced in the "preaeration" basin and the Alka Seltzer Test on effluents from George AFB and some other wastes (not named) is reminiscent of a detergent type foam produced by nonbiodegradable soaps of the 1950s.

The brown foam has been associated with the presence of significant numbers of filamentous organisms, Nocardia. See Figure 3. Samples were taken on 1 September confirming HQAFCESA August findings of a Nocardia foam.

He states that there is considerable evidence (unpublished) that the severity of Nocardia foaming is influenced by the presence of surface active agents, and these surface active agents are the root causes of the operating problem at VVWRA.

Figure 1: Foam in Mixed Liquor Channel

They concluded that the most likely cause of the difficulties at VVWRA is the presence of nonbiodegradable surfactants in the wastewater from George AFB, though further investigations are necessary to confirm this likely cause, to include:

a. Identification of chemical nature of surfactants at GAFB and other waste streams.

b. Assessment of biodegradability of identified surfactants

c. Performance of surface tension measurements on the various streams to VVWRA plant.

The use of the aeration basin as a "preaeration basin" has effectively reduced the aeration capacity by 33%. He strongly recommended that the industrial portion of the GAFB waste be separated from the domestic portion and pretreated for the removal of nonbiodegradable surfactants and for the control of fuel spills.

C. George AFB Wastewater Discharge Limitations

The base sewerage service is regulated by VVWRA Ordinance No. 80-19, Rules and Regulations for Sewerage Service (included as Attachment 1) originally issued in October 80 and amended five times by the Victor Valley Wastewater Reclamation Authority. The latest amendment was issued on June 27, 1985. The permit limits the pH of the base effluent, the wastewater discharge rate from septic tanks and chemical toilets, and requires the base to limit the release of oils and greases, explosive mixtures, noxious materials, improperly shredded garbage, radioactive wastes, solid or viscous wastes, toxic substances, and discolored material. The effluent parameters, limitations, and monitoring schedules are contained in Table 1.

D. Area Communities Surveyed

The following communities are connected to the VVWRA Regional Sewage Treatment plant. Sewage is metered through metering stations, with the metering stations named for the communities they are located in. Victorville has two metering stations, Victorville 1 and 2. (See Figure 4 for Typical Metering Station.)

1. Apple Valley - Located 4 miles east of the base, population 40,000

2. Victorville - Adjoins the base to the south, population 25,000

3. Adelanto - Adjoins the base to the west, population 4,000

4. Oro Grande - Adjoins the base to the east, population 4,000

5. Hesperia - Located 6 miles south of the base, population 45,000

6. Spring Valley Lake - A master planned recreational resort community is designed around a 200 acre man-made lake. Located 7 miles southwest of the base, population 40,000

TABLE 1

EFFLUENT LIMITATIONS AND MONITORING SCHEDULE,
AS OF 27 June 1985

Effluent Parameter	Maximum Concentration (mg/L) 24 Hour Flow Proportioned Composite
Arsenic	1.0
Cadmium	1.0
Hexavalent Chromium	1.0
Total Chromium	1.5
Copper	2.0
Lead	2.0
Mercury	0.03
Nickel	3.0
Silver	2.0
Zinc	3.0
Selenium	0.5
Cyanide (Total)	1.0
Cyanide (Free)	1.0
Boron	1.0
Fluoride	5.0
Nitrogen (Total)	54.0
Chlorinated Hydrocarbons	Essentially None
Phenolic Compounds	1.5
Sulfide (Dissolved)	0.5
Oil and Grease	100
Suspended Solids	*500
Chloride	100
Sulfate	100
Iron	10.1
Sodium	125
MBAS	2.0
Total Dissolved Solids	650

*Shall not include hydroxides of heavy metals and toxicants

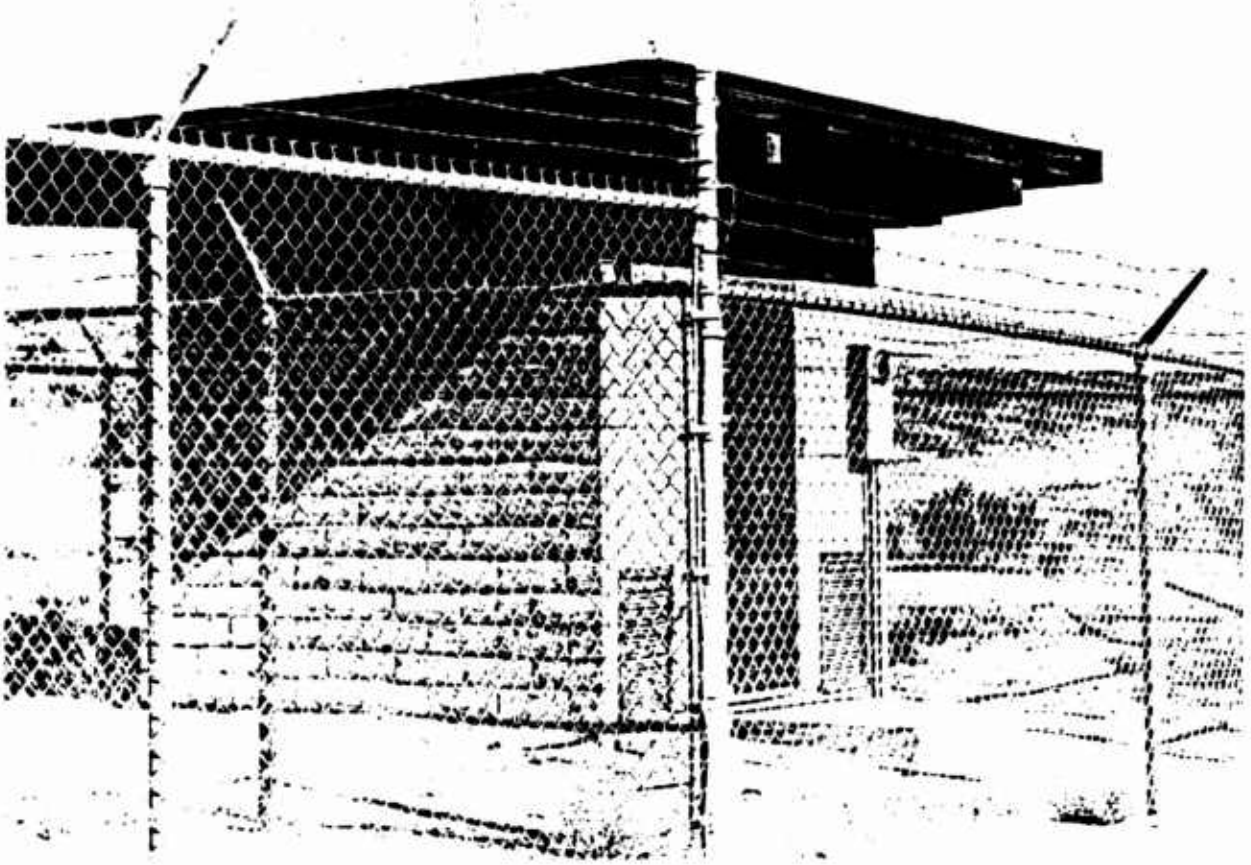


Figure 4: George 2 Metering Station

III. PROCEDURES

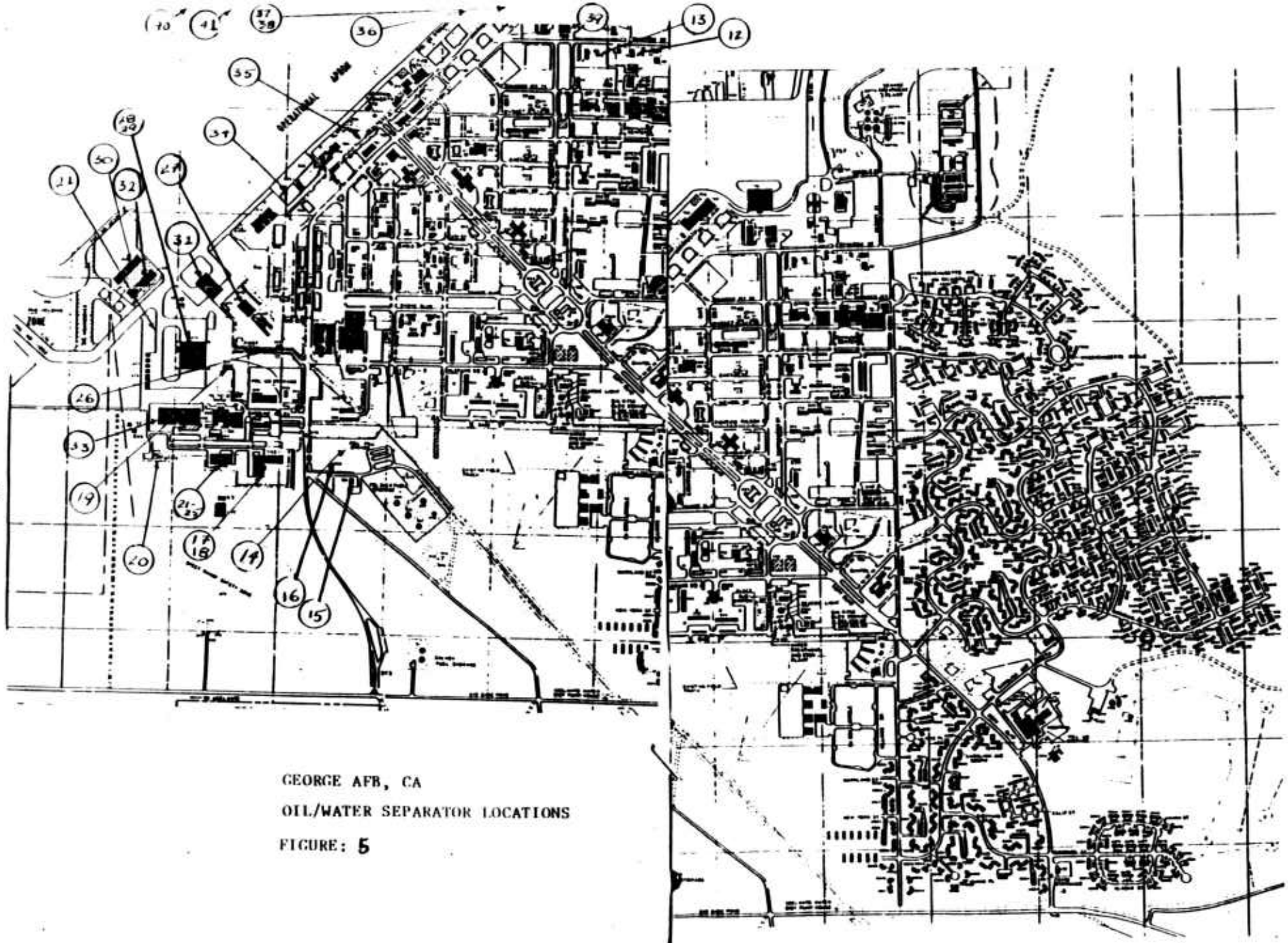
A. Flow

1. VVWRA provided flow data for the survey period from the metering stations identified as sample sites 3-11 in Table 2. These data are included in Attachment 2, and used in calculations throughout this report.

2. Palmer Bowlus flumes were set up in the discharge boxes of two washrack oil/water separators, buildings 645 and 755 and the engine repair shop, building 686. Depths in flumes were measured continuously for seven days with Manning 1100 Ultrasonic flowmeters by installing the transducer in a plywood cover over the flume.

B. Sampling

1. Sampling Site Numbers and Locations. A list of sampling site numbers and locations where the samples were taken is shown in Table 2. Locations of the George AFB oil/water separators are shown in Figure 5.



GEORGE AFB, CA

OIL/WATER SEPARATOR LOCATIONS

FIGURE: 5

TABLE 2

SITE NUMBERS ON LOCATIONS WHERE SAMPLES WERE TAKEN

Site No.	SAMPLE SITES AND NUMBERS
1	VVWRA Plant Influent
2	VVWRA Plant Effluent
3	Apple Valley
4	Hesperia
5	Spring Valley
6	Victorville 1
7	Victorville 2
8	George AFB 1
9	George AFB 2
10	Oro Grande
11	Adelanto

George AFB Oil/Water Separators

12	Building	14	BX Car Wash
13	Building	18	Auto Hobby Shop
14	Building	536	Fuels
15	Building	551/552	Fuels
16	Building	552	Fuel Truck Maintenance
17	Building	555	Vehicle Maintenance (south)
18	Building	555	Vehicle Maintenance (east) washrack
19	Building	559	37 EMS Armament Maint.
20	Building	568	Test Cell
21	Building	645	Aircraft Washrack
22	Building	652	Aircraft Paint Shop 1 east
23	Building	652	Aircraft Paint Shop 2 spray booth, waterfall
24	Building	652	Aircraft Paint Shop 3 diptank, fiberglass
25	Building	652	Aircraft Paint Shop 4 fab., welding
26	Building	668	Truck Car Wash
27	Building	670	Civil Engineering
28	Building	676	Aircraft Maint. 37 Phase
29	Building	676	Aircraft Maint. 35 Phase, Wheel & Tire
30	Building	682	Aircraft Maint. Egress, Corrosion, 37 AGE
31	Building	683	Aircraft Maint.
32	Building	685A,B,C	Aircraft Maint.
33	Building	686	Aircraft Engine Maint.
34	Building	691	Aircraft Maint.
35	Building	708	Fuel Pump Station
36	Building	755	Aircraft Washrack
37	Building	775	Storm Water System
38	Building	780	Storm Maint.
39	Building	789	ACE Washrack
40	Building	832	ACE Washrack
41	Building	849	Fire Dept. Training

2. Sampling Frequency

Daily collection of the 24 hour composite samples was accomplished at the wastewater sampling sites indicated in Table 2 for seven days, except at Site 2, the sewage treatment plant effluent, where two day samples were taken. Composite sampling (equiproportional) was accomplished using ISCO Automatic Wastewater Composite Samplers, models 1580 and 2100. Grabs samples were taken at the George AFB oil/water separators. Additionally, grab samples for EPA methods 624, 645, and 608 were taken for seven days from VVWRA plant influent, George 1, and George 2. Samples were analyzed for the parameters listed in Tables 3 and 4.

C. Hazardous Waste Survey

A comprehensive hazardous waste survey was conducted. Chemical usage was recorded by shop personnel for the period of the survey. Collection, storage, and disposal practices and storage points were surveyed for compliance with 40 CFR 260-265, The Environmental Protection Agency's regulations for hazardous waste management. A description and highlights of the waste management practice of the shops surveyed are included in the results and discussion section of this report.

D. Microbiological Survey

Grab samples were collected of the foam and the mixed liquor and sent to the USAFOEHL for analysis by Eikelboom's method described by Stom and Jenkins (4). Two staining techniques were used; the Gram stain and the Neisser stain. The filaments were examined at high magnification (1000X) using phase contrast microscopy.

E. Aquatic Bioassay

Aquatic toxicity tests were conducted in accordance with Standard Methods (5). Fathead minnows, Pimephales promelas, and juvenile water fleas, Daphnia magna, were used as test organisms. The standard test is a 48 hour acute toxicity test using 2000 ml samples for fish and 250 ml samples for the Daphnia. The USAFOEHL Aquatic Bioassay Information Sheet is included as Attachment 3.

F. Biodegradability Study

A bench scale activated sludge plant is maintained at the USAFOEHL. The apparatus is shown in Figure 6. Flow rates and procedures are included as Attachment 4. Two tests were performed, one using 10% effluent from the oil/water separator at the building 645 washrack and one test with 10% effluent from the building 559 corrosion control oil/water separator. The control reactor was fed 100% primary clarifier effluent. The operating parameters for the reactors are presented in Table 5.

TABLE 3

ANALYSIS AND PRESERVATION METHODS FOR SITES 1-11

Analysis	Preservation	Method	Where	Who
BOD-5	none	A405.1	on-site	USAFOEHL
COD	none	Hach Mod. A410.4	on-site	USAFOEHL
Nonfilterable Residue	none	A160.2	on-site	USAFOEHL
Filterable Residue	none	A160.1	on-site	USAFOEHL
pH	none	A423	on-site	USAFOEHL
Temperature	none	E170.1	on-site	USAFOEHL
MBAS	none	E425.1	contract lab	UBTL*
Ammonia-Nitrogen	H_2SO_4	E350.1	contract lab	UBTL*
Nitrates-Nitrites	H_2SO_4	E353.2	contract lab	UBTL*
Total Kejeldahl Nitrogen	H_2SO_4	E351.2	contract lab	UBTL*
Total Organic Carbon (TOC)	H_2SO_4	E415.2	contract lab	UBTL*
Total Organic Halogen (TOX)	NONE	E450.1	contract lab	UBTL*
Total Phosphorus	H_2SO_4	E365.4	contract lab	UBTL*
Orthophosphate	H_2SO_4	E365.1	contract lab	UBTL*
Cyanide	NaOH	E335.3	contract lab	UBTL*
ICP Metals Screen As, B, Cd, Ca, Cr, Co, Fe, Pb, Mg, Mn, Ni, La, Se, Zn, Ag, Al, Ba, Be	HNO_3 Mg	E200.7	contract lab	UBTL*
Mercury	HNO_3	E245.1	contract lab	UBTL*
Alkalinity	NONE	E310.1	contract lab	UBTL*
Chlorides	NONE	E325.1	contract lab	UBTL*
Conductance, Specific	NONE	E120.1	contract lab	UBTL*
Sulfate	NONE	E375.2	contract lab	UBTL*
Sulfides	$Zn(C_2H_3O_2)2$	E376.2	contract lab	UBTL*
Total Extract. Phenols	H_2SO_4	E420.2	contract lab	UBTL*
Oils and Grease, Total Recoverable	H_2SO_4	E413.1	contract lab	UBTL*
Petroleum Hydrocarbons	H_2SO_4	E418.1	contract lab	UBTL*
Organochlorine Pesticides and PCB	NONE	E608	contract lab	UBTL*
Volatile Organics	H_2SO_4	E624	contract lab	UBTL*
Base/Neutral/Acid Extractables	NONE	E625	contract lab	UBTL*

Notes: A - Standard Methods for the Evaluation of Water and Wastewater

E - EPA Methods for Chemical Analysis of Water and Wastes

*UBTL - Utah Biomedical Test Laboratories, Salt Lake City, Utah

TABLE 4

ANALYSIS AND PRESERVATION METHODS FOR SITES 11-41

Analysis	Preservation	Method	Where	Who
COD	H_2SO_4, 4DRGC	Hach Mod. A405.1	on-site	USAFOEHL
pH	NONE	A423	on-site	USAFOEHL
MBAS	NONE	E425.1	contract lab	UBTL
ICP Metals	HNO_3	E200.7	contract lab	UBTL
Mercury	HNO_3	E245.1	contract lab	UBTL
Sulfides	$Zn(C_2H_3O_2)2$	E376.2	contract lab	UBTL
Total Phenols	H_2SO_4	E420.2	contract lab	UBTL
Specific Conductance	NONE	E120.1	contract lab	UBTL
Characteristic Hazardous Waste (ignitability, corrosivity, EP toxicity, reactivity)	NONE		contract lab	UBTL

Notes: A - Standard Methods for the Evaluation of Water and Wastewater
E - EPA Methods for Chemical Analysis of Water and Wastes
*UBTL - Utah Biomedical Test Laboratories, Salt Lake City, Utah

TABLE 5

REACTOR OPERATING PARAMETERS

Building 645 Washrack Effluent

Parameter	Value			
Reactor Volume	4 liters			
Clarifier Volume	1 liter			
Food-to-Microorganism Ratio, F:M	0.4-0.8 mg/l BOD5/mg/l MLSS			
Feed Rate	8 liters/day			
Hydraulic Detention Time	0.5 days			
BOD 5 mg/l Effluent: 1080	Test: 254		Control:	163
COD mg/l Effluent: 6200	Test: 947		Control:	363
Reactor Temperature	20-25 degrees C			
Sludge Volume Index	Test: 152		Control:	225
Mixed Liquor Suspended Solids mg/l	Test: 2490		Control:	3100
Solids Retention Time	Test: 26.9 days		Control:	21.4
Air Required	Test: 300 ml/min		Control:	100 ml/min
Return Sludge Ratio	0.4-1.0			

TABLE 5 Continued

Building 559 Corrosion Control Effluent

Parameter	Value
Reactor Volume	4 Liters
Clarifier Volume	1 Liter
Food-to-Microorganism Ratio, F:M	0.4-0.8 mg/L BOD5/mg/L MLSS
Feed Rate	8 Liters/Day
Hydraulic Detention Time	0.5 Days
BOD 5 mg/l Effluent: 210	Test: 210 Control: 210
COD mg/l Effluent: 2400	Test: 561 Control: 350
Reactor Temperature	20-25 degrees C
Sludge Volume Index	Test: 183 Control: 225
Mixed Liquor Suspended Solids mg/l	Test: 3550 Control: 1840
Solids Retention Time	Test: 26.9 Control: 21.4 Days
Air Required	Test: 300 ml/min Control: 100 ml/min
Return Sludge Ratio	0.4-1.0

IV. RESULTS AND DISCUSSION

A. Review of Previous Data

Attachment 5 compiles the wastewater sampling results provided by VVWRA sewage treatment plant personnel. In most instances, samples show significant concentrations of organic aliphatic and aromatic molecules associated with fuels. Some results show chlorinated aliphatics (i.e., 1,1,1 trichloroethane) used as solvents on base.

B. Wastewater Characterization Survey

1. Flow

a. The flow data for the month of August 86 are summarized in Table 6. Complete results are included in Attachment 2.

TABLE 6

METER STATION AVERAGE FLOW FOR AUGUST 86

SITE No.	NAME	FLOW (X1000 GAL)	% TOTAL
1	VVWRA Plant Influent	4022	100.0 (99.9%)
3	Apple Valley	286	7.1
4	Hesperia	136	3.4
5	Spring Valley Lake	383	9.5
6	Victorville 1	2284	56.8
7	Victorville 2	82.2	2.0
8	George 1	529	13.2
9	George 2	210	5.2
10	Oro Grande	68	1.7
11	Adelanto	42	1.0

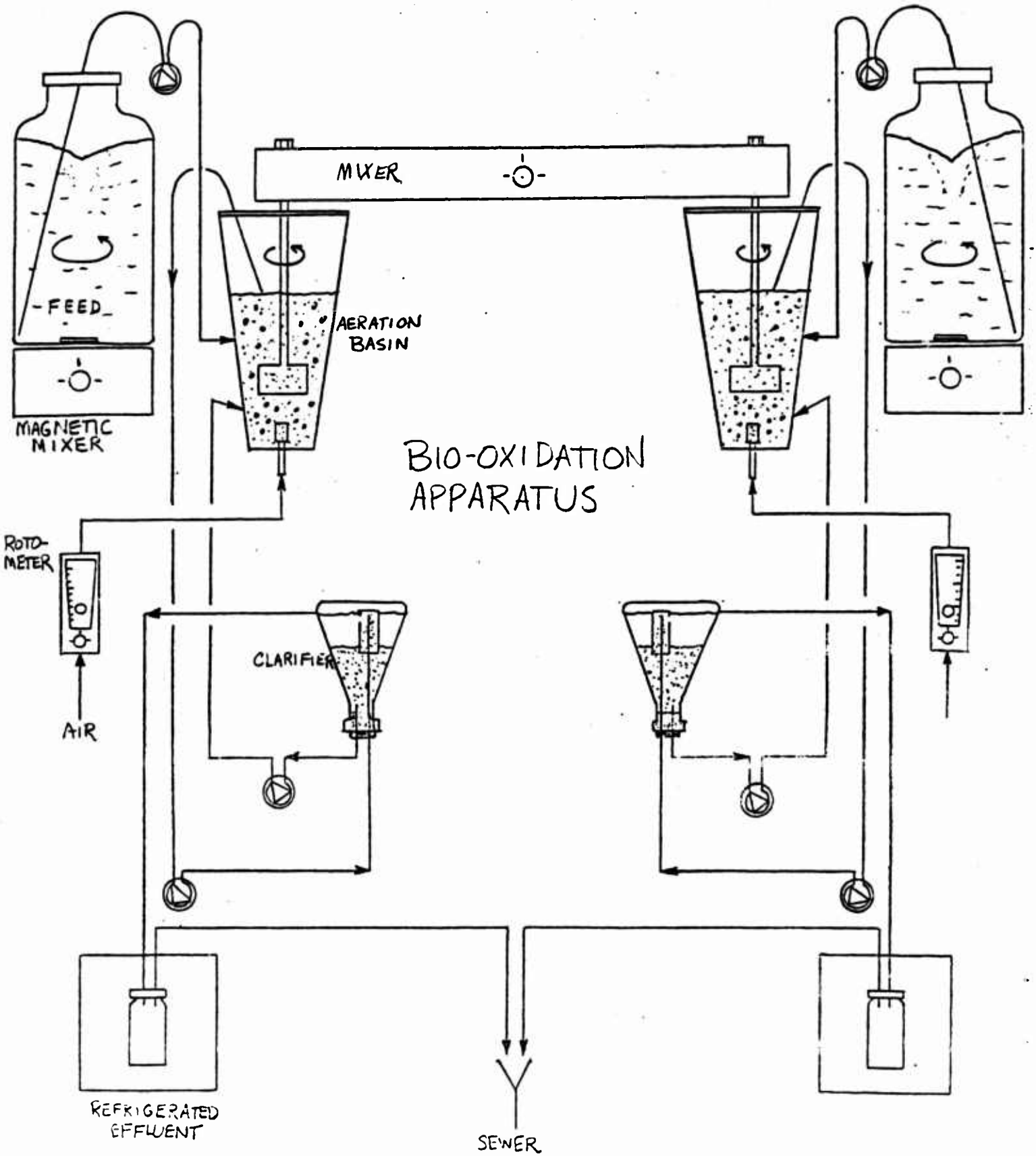


FIGURE 6: Bench Scale Bio-oxidation Unit

b. The seven day flow measurements taken at buildings 686, 755, and 645 had to be disregarded because of problems with the flow recorders, e.g., the curiosity of some personnel who kept moving the plywood sheets to see the flume, knocking the ultrasonic probe off target.

2. Biochemical Oxygen Demand

Table 7 summarizes the results of the BOD testing and the loading on the plant for the two days all the quality control checks in Method A405.1 were met. This occurred for August 24th and 26th. Flow data from August 86 was used for the calculations. A summary of all the results, even when the glutamic acid quality control results did not fall in the required range are included in Attachment 6.

TABLE 7

BOD5 LOADING, SEWAGE TREATMENT PLANT

Site	Avg BOD mg/L	FLOW X1000 Gal	LOADING No./Day	% TOTAL
1 VVWRAIN	145	4022	4864	100.0 (99.6 Calc.)
3 A.V.	154	286	367	7.5
4 HESP.	473	136	536	11.0
5 SP. VAL.	94	383	300	6.2
6 VV #1	130	2284	2476	50.9
7 VV #2	160	82	110	2.3
8 GAFB #1	186	529	821	16.9
9 GAFB #2	106	210	186	3.8
10 ORO GN	50	68	28	.6
11 ADEL	63	42	22	.4

3. Chemical Oxygen Demand

A similar table can be made for COD, another indicator of the organic nature of the sewage, though it indicates oxidizable inorganic material as well. The summary of results of the seven day COD sampling are presented in Table 8.

TABLE 8

COD (mg/l) RESULTS AND PLANT LOADING

Site	COD(avg) mg/l	FLOW galX1000	LOADING No./day	% TOTAL
1 WWRATIN	450	4022	15,094	100 (94.6 calc.)
3 A.V.	431	286	1028	6.8
4 HESP.	1081	136	1226	8.1
5 SP. VAL.	203	383	648	4.3
6 VV #1	421	2284	8019	53.1
7 VV #2	484	82	331	2.2
8 GAFB #1	476	529	2100	13.9
9 GAFB #2	461	210	807	5.3
10 ORO GN.	111	68	63	.4
11 ADEL.	199	42	70	.5

4. COD/BOD Ratios

Looking at both COD and BOD results in comparison to flow, Table 9 can be generated.

TABLE 9

BOD5 AND COD PERCENTAGES AND RATIOS

Station	%FLOW	%COD	%BOD	BOD/COD
Apple Valley	7.1	6.8	7.5	.36
Hesperia	3.4	8.4	11.0	.44
Spring Valley Lake	9.5	4.3	6.2	.46
Victorville	58.8	55.3	53.2	.32
George AFB	18.4	19.2	20.7	.32
Oro Grande	1.7	0.4	0.6	.45
Adelanto	1.0	0.5	0.4	.32

5. Additional Parameters

a. The average values for the composite samples from sites 1-11 are summarized in Attachment 7. When values were obtained for all seven days (site 1 two days) they are shown without notation. When values were below the detection limits of the analytical techniques, the average of the detected values is given with the number of days detected immediately following in brackets. For example: Site 8, SO4, 9(6) indicates nine milligrams per liter is the average of the six days on which detectable values were found; on one day concentrations were below the detection limit of the method.

b. Additional discussion of the MBAS results is necessary, in light of the supposition that the detergents used at George AFB are the cause of the foaming problem at the VVWRA plant. George AFB contributes 32.7% of the surfactants to the VVWRA plant, as measured by the Methylene Blue Active Substances (MBAS) test.

c. The MBAS test is useful in estimating the anionic surfactant content of wastewater. Surfactants of the sulfonate type are strongly reactive. The Cobalt thiocyanide active substances (CTAS) test is used to estimate nonionic surfactant concentrations, such as those based on octyl and nonylphenols. Neither the USAFOEHL nor its contract laboratory, UBTL, was equipped to perform this analysis, so although sampled for, CTAS was not analyzed.

d. The aircraft surface contact cleaner used most often on base is strongly MBAS reactive. The MBAS loading on the VVWRA plant is summarized in Table 10.

TABLE 10

SURFACTANT (MBAS) LOADING AT VVWRA PLANT

Site	MBAS (mg/l)	Flow (X1000gal)	Load (No./day)	%Total
1 VVWRA IN	2.5	4022	83.9	100 (100.8 calc.)
3 A.V.	2.7	286	6.4	7.6
4 HESP.	3.6	136	4.1	4.9
5 SP. VAL	2.5	383	8.0	9.5
6 VV 1	2.7	2284	51.4	61.2
7 VV 2	3.4	82	2.3	2.7
8 GAFB 1	5.3	529	23.4	27.9
9 GAFB 2	2.3	210	4.0	4.8
10 ORO GN.	1.8	68	1.0	1.2
11 ADEL.	0.5	42	0.2	0.2

6. Volatile Organic Compounds EPA Method 624

Daily grab sample results for the seven daily periods at George 1, George 2 and treatment plant influent are summarized in Attachment 8. The priority pollutants, chloromethane, vinyl chloride, methylene chloride, trichlorotrifluoromethane, chloroform, trichloroethene, benzene, tetrachloroethene, toluene, and ethyl benzene were detected in the George AFB discharge. Twenty-one other volatile organic compounds were detected.

7. Acid/Base/Neutral Extractables EPA Method 625

Daily composite sample results for the seven daily periods taken at George 1, George 2, and the treatment plant influent are summarized in Attachment 9. Additional semi-volatile organic compounds are also included. EPA Method 625 compounds not included in Attachment 8 were not detected. The

priority pollutants detected in discharges from George AFB are: phenol, 1,4 dichlorobenzene, 2,4 dimethyi phenol, napthalene, diethyl phthalate, pentachlorophenol, di-n-butyl phthalate, benzyl butyl phythalate, bis (2-ethyl hexyl) phthalate, and di-n-octylphthalate. Thirty-five additional semi-volatile organics were detected in the George AFB effluent.

8. Oil/water Separator Survey

The results of testing for parameters shown in Table 4 for Resource Conservation and Recovery Act (RCRA) characteristic hazardous wastes are presented in Attachment 10 by including detected results. Attachment 11 contains the results of additional chemical parameters helpful in characterizing the separator contents.

9. Microbiological Survey

Four samples, two of foam and two of mixed liquor, were analyzed by Dr Ralph J. Rascati, Associate Professor of Biology, Kennesaw College, Marietta, Georgia while working in the Summer Faculty Research Program at the USAFOEHL. Samples were taken on 7 and 18 August. In each sample Nocardia was identified. Other filamentous bacteria identified were Type 021L and Type 0092. Furthermore, these Nocardia or Nocardia-like organisms were more abundant in the foam samples (40-70% total number of bacteria) than in the mixed liquor (20-40%).

10. Bioassay of Sewage Treatment Plant Effluent

In duplicate samples, performed at USAFOEHL Ecology Function, 100% of the Daphnia and 90% of the minnows survived after 48 hours in 100% dechlorinated VVWRA effluent. Results indicate that 10% mortality is within the normal range for classifying the effluent as nontoxic.

11. Bio-oxidation Study

No foaming was observed in the two week study using a 10% mixture of the effluent from the building 686 and 90% locally obtained primary clarifier effluent. BOD5 removal was 92%, COD removal was 86%. Total suspended solids removal was 99.4%. Unfortunately, because of insufficient sample, the MBAS of the effluent was not measured. Other results are contained in Attachment 12.

Effluent from the separator servicing building 559, effected the BOD removal of the bench scale plant, as removal efficiency fell to 62% from 86%, probably due to the toxic effect of metals. Other results are contained in Attachment 12.

C. Hazardous Waste Survey

Following are the results of a shop-by-shop survey of the chemical usage, chemical handling, storage and disposal practices for the major industrial operations at George AFB. All of the following shops are sewered by the George 1 interceptor sewer system, except the 144 FIW/ANG.

a. 831 CSG Auto Hobby Shop, building 18

The Auto Hobby shop is housed in a "garage type" building containing state-of-the-art equipment for base personnel to maintain and repair privately owned vehicles. A washrack is located behind the shop for washing engines and vehicles. The compound discharged most frequently from this area is diluted aircraft surface cleaning compound, consisting of ethylene glycol monobutyl ether, monyl phenol polyethylene glycol, and the surfactant, sodium dodecyl benzenesulfonate. This cleaning compound is used to wash floors and vehicles. Waste oils, antifreeze, fluids and paint wastes are collected in 55 gallon drums and disposed of as hazardous waste by a contractor.

b. 831 CSG Base Photo Lab, building 350

This small photo processing lab is used for processing and developing official photos, making slides for briefings, and producing mission support products. Waste photo processing chemicals are stored in 15 gallon containers and passed through a silver recovery unit before discharge to George 1.

c. 831 CE Entomology, building 513

The entomology shop is responsible for pest control throughout the base. Chemicals employed by this shop are used up in the process. Any leftover chemicals are drained and stored in containers for later use. After draining, the equipment is rinsed and stored. The rinsate is discharged to the sewer.

d. 831 TRNS Minor Maintenance, building 550

Personnel perform repairs requiring less than $20 and one hour labor on cars and trucks. Aircraft surface cleaning compound is used to clean floors. Waste oils, grease, and antifreeze are stored in tanks outside building 555 and picked up by a contractor.

e. 831 Supply Fuels, building 536

Supply Fuels Division is responsible for the storage and distribution of jet fuels. A washrack used for fuel trucks employs a 1100 gallon mixing tank. Aircraft surface cleaning compound diluted 7-16 parts water to 1 part soap is used. This washrack is used approximately once a week. Wastewater flows through a oil/water separator into the sewer.

f. 831 Power Production and General Maintenance, building 540

Power Production and General Maintenance are responsible for maintaining generator and diesel engines. Work ranges from changing batteries to overhauling engines. Battery acid is neutralized and discharged to the sewer. Waste oils, grease, solvents and thinners are placed in 55 gallon drums for disposal by contract.

g. 831 Supply Fuels Lab, building 551

The fuels lab checks JP-4 and JP-5 samples. Samples analyzed in the lab are held in a storage container and returned to storage. Laboratory chemicals such as petroleum ether, isopropyl alcohol, and sulfuric acid are normally used up in the procedures and any waste chemicals are stored in containers and picked up by contract.

h. 831 Supply Fuels, building 552

Personnel maintain and repair fuel trucks which transport JP-4 from the storage yard to the flightline. Duties range from oil changes t engine overhauls. Waste JP-4 and oils are collected and placed in outdoor storage tanks. Occasionally JP-4 and oil are spilled on the floor and enter the oil/water separator via the floor drain. A cleaning compound containing an aromatic solvent, amine, and surfactant is used to clean floors.

i. 831 TRNS General Maintenance, building 555

This facility is divided into Allied Trades, General Purpose, and Special Purpose. Allied Trades is responsible for radiator repair, auto body work and glass work. The major wastes are thinners, paints, and hardeners. General Purpose maintains and repairs all government vehicles. The major waste is engine oil. Special Purpose maintains and repairs heavy equipment. The major wastes are engine oils and hyraulic and transmission oils. Oils and antifreeze are collected, stored and disposed of by contract. Waste paints and thinners are placed in a 55 gallon drum and disposed of as hazardous waste. Aircraft surface cleaner is diluted 1:20 and used to clean floors.

j. Vehicle Operations, building 558

Vehicle operations has a vehicle washrack. Peak use at this washrack is on Fridays and Sundays. Cleaning agent, P-D-2208, type 2, (sodium dodecyl benzene sulfonate, nonyl phenol ethoxylate) is diluted 1:120 with water. The rinsewater passes through a grit trap before entering the George 1 system.

k. 37 EMS Armaments System, building 559

This shop cleans, maintains, and repairs the mechanical and electrical components of weapon pylons, racks, and launchers for the F4E and F4G and F4E 20 mm guns. PD-680, an aliphatic hydrocarbon degreaser, and oils are used in a closed system to clean and preserve weapon components. Spent chemicals are drummed and disposed of by contract. A solvent, 1,1,1 trichloroethane, is used to clean pins and electrical connectors and is used up in the process.

l. 831 EMS Survival Equipment, building 562

The EMS Survival Equipment Branch is responsible for parachute repair and maintenance. The chemicals used are consumed during operations.

m. Non Destructive Inspection (NDI), building 564

The NDI shop uses x-ray, fluorescent dye techniques, atomic absorbance, and other techniques to detect structural defects in aircraft components. Magnetic particle inspection is done in a closed system using "magnetic inspect" (either PD-680 or deodorized kerosene and iron filings) and a large magnet to find flaws in parts. Penetrant inspection is done in an open system using penetrant, emulsifier and developer. A part is first dipped into the penetrant (petroleum hydrocarbons, diphenyloctyl phosphate, ethoxylated octyl phenol, fluorescent dye), placed in an emulsifier (ethoxylated fatty alcohols, hydrocarbon oil, naphthenic terpineol, and dye), rinsed (with the rinsate entering the sewer) and allowed to drip dry. The part is placed in the developer prior to drying in an oven. Finally, the part is inspected and rinsed again. The process is shown in Figure 7. The photo lab uses a fixer and developer to process x-ray film. The chemicals and rinse flows through a silver recovery unit before entering the sewer.

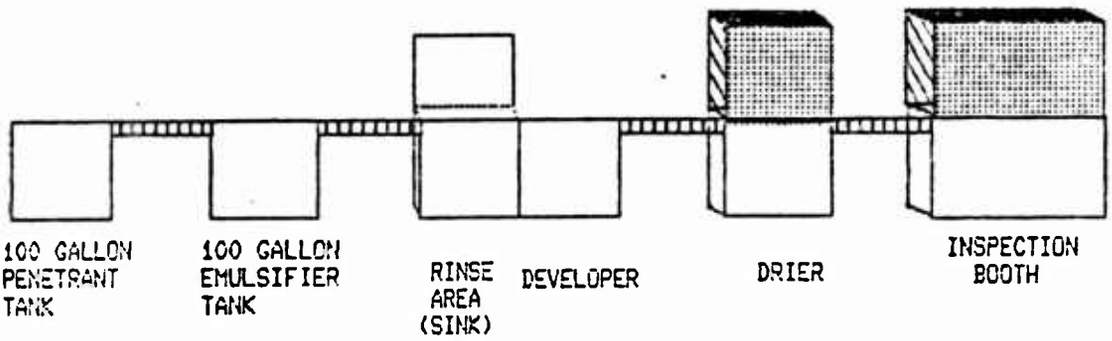


FIGURE 7: PENETRANT INSPECTION PROCESS

n. 35 EMS Fabrication, building 652

This building, shown in Figure 8, houses four shops; Corrosion Control, Structural Repair, Machine Shop, and Metal Processing.

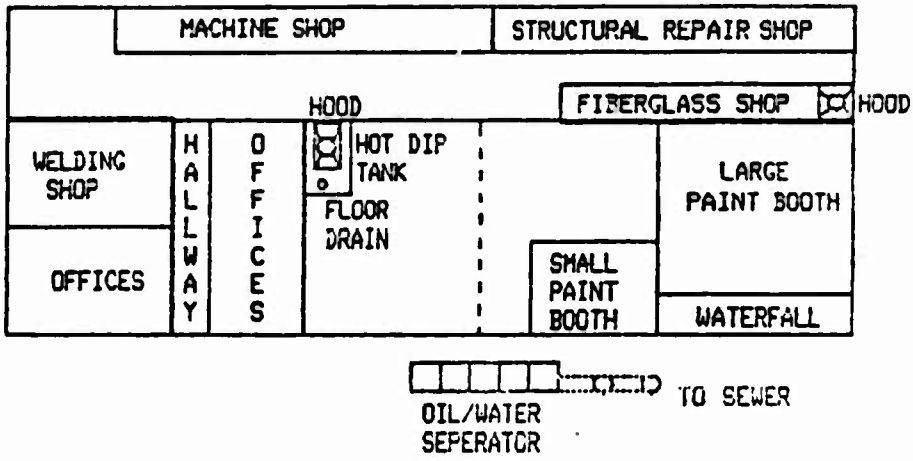


FIGURE 3: 35th EMS FABRICATION SHOP FLOOR PLAN

The Corrosion Control Shop strips wheels and aircraft parts, and paints flightline equipment. All small non-steel parts are stripped in a hot dip tank containing ethanolamine until the paint is removed before being raised by a hydraulic platform and allow to drip dry. Afterwards, the parts are placed on the floor and rinsed with water. This rinsewater enters an oil/water separator before entering the sewer. Sodium hydroxide is occasionally used to strip paint from steel parts. B&B 4411 is also used in small quantities to remove polyurethane paint.

Aircraft are painted in building 685C. Small parts are painted in one of two paint areas in the building. Two paint booths, one small and another larger one with a waterfall, are used. Paint booths are cleaned out once per month with sludges placed in 55 gallon drums and disposed of by contract.

Structural Repair shop repairs parts using fiberglass and metals. Repaired parts are sanded, prepped, sealed and taken to the paint shop for painting. There are no floor drains in this shop.

The Machine Shop manufactures metal parts from stock. The major chemical used is a water soluble cutting oil.

The Metal Processing Shop (Welding Shop) repairs by welding. This shop uses no industrial chemicals.

o. 831 CES Pavement and Grounds, building 661

The Pavements and Grounds Shop is responsible for work done on concrete and asphalt surfaces. No industrial chemicals are used.

p. 831 Civil Engineering Compound, building 670

The Plumbing Shop uses PVC pipe and "Weld On" softening resin to connect them. As new connections are made out in the field excess resin becomes part of the constituents of wastewater. No chemicals are used in the shop.

The Electric Shops employ corrosion sprays, cleaning compounds for electrical connectors, and transmission fluid. These chemicals are used in small quantities and are used up in the process. Also, a floor cleaning compound is used in a floor cleaning machine.

The Paint Shop paints facilities and equipment other than flightline equipment and vehicles. Minimal painting is done inside the shop. All waste thinners and waste paints are stored in 55 gallon drums and disposed of by contract.

q. 831 CES Liquid Fuels Maintenance, building 674

This shop maintains aircraft refueling systems (pumping station, hydrants) on the flightline. No chemical usage was found in the shop; however, paints, thinners, and oil are used on the flightline.

r. Maintenance Training, building 683

This hangar is used for training of personnel responsible for aircraft fuel sampling and munition loading. Occasionally, fuel or oil is spilled but is picked up with "Speedy Dry". Floors are cleaned with a soap diluted to 12:1.

s. 35 and 37 Phase Inspection, building 676

F-4 fighter aircraft are inspected in this facility. Occasionally oils and hydraulic fluids spill onto the floor. A Wheel and Tire shop is housed within which uses PD-680 to clean and strip aircraft wheels. The PD-680 is contained in two tanks, and when the solvent needs changing, it is emptied into 55 gallon drums for disposal by the contractor. The Pneudraulics shop is also in this building. Neither shop has floor drains.

t. 37 EMS Hanger, building 682

This hangar contains three shops: Egress, Aerospace Ground Equipment (AGE), and Corrosion Control. Corrosion Control also operates a washrack near the hangar.

The Egress shop maintains ejection seats, using spray cleaners and paints. A PD-680 degreasing tank is used to clean parts. The solvent is drummed and disposed of by contract when spent. The area has no floor drain.

EMS AGE repairs AGE equipment. Soap used to clean the floors enters the sewer through a floor drain.

Corrosion Control strips and paints aircraft and AGE equipment. Stripping is accomplished by sanding and small application of an epoxy stripper (methylene chloride, methyl alcohol, sodium chromate, and ammonium hydroxide). Paint stripper is applied, wiped off with rags and then the area is rinsed with water. Smaller parts are wire brushed and soaked in a methyl ethyl ketone (MEK) thinner contained in a half 55 gallon drum. Corrosion Control operates a washrack at building 684. One person is responsible for properly mixing the 1100 gallon soap reservoir at the washrack. Aircraft surface cleaner is diluted 7-12:1. The washrack also has a foam generator, using a dilution ratio of 4:1.

u. 37 and 35 EMS Fuel Cell Repair, building 685 A,B

These shops remove and replace fuel cells and components from aircraft for examination and repair. Both areas have floor drains. Spills of JP-4, MEK, and PD-680 are possible. The floor drains are connected to an oil/water separator and George 1. Corrosion control operations similar to those described in building 682 are also performed in this hangar.

v. 27 TASS and 37 CRS Engine Shop, building 686

This facility houses both the 27 TASS and 37 CRS Engine Shops. The 37 CRS shop is broken into four subsections: Engine Wash Rack, ACSU Accessories, Jet Engine Interim Maintenance, Material Support Tool Room (MSTU), and the 37 Engine Support Equipment Section (ESES). A schematic of this building is shown in Figure 8.

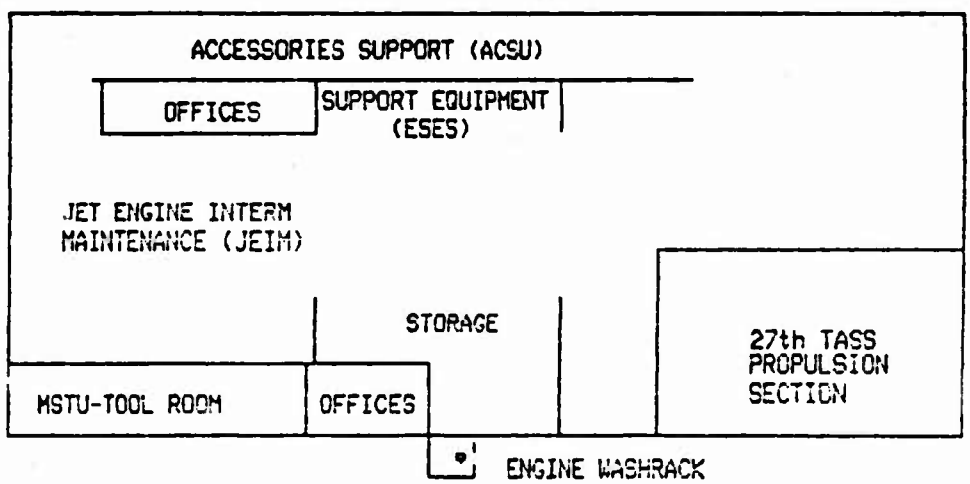


FIGURE 9: 37th EMS Engine Shop Floor Plan

The 27 TASS rebuilds OV-10 engines. This shop uses PD-680 and engine oil. Waste PD-680 and oils are stored in an outdoor tank, and emptied by contract.

The 37 CRS Engine washrack is used to clean afterburner parts heavily coated with carbon. The washrack is located outside the building and consists of a large tank containing the cleaner (B&B Chemical Co. M47, [5% sodium hydroxide, biodegradable soaps and surfactants]), a floor drain and water. Parts are soaked, allowed to drip, then hosed off and dried. Aircraft cleaning compound is used for parts. The spent B&B M47 is barreled, stored and disposed of by contract.

The 37 ACSU Accessories section uses 1,1,1 trichloroethane among other chemicals to clean bolts and filters. The solvent is washed off at the washrack.

The 37 ESES section maintains engine support equipment, such as trailers and stands. Oils and grease are used by this section.

w. 27 TASS Phase Inspection Hangar, building 756

This hangar houses the following sections: 27 TASS Phase Inspection, 27 TASS Structural Repair, 35 EMS Egress.

The 27 TASS Phase Inspection inspects and tears down the OV-10 aircraft. A vat of PD-680 is used to clean parts before inspection. The contents of the vat are pumped monthly into 55 gallon drums and disposed of by contract. The floors are cleaned by a machine using a 20:1 soap mixture. The soap is washed off into the floor drains. Waste JP-4 fuel, oils, and hydraulic fluid are collected, stored in drums, and disposed of by recyling or disposal by contract.

The 27 TASS Structural Repair is responsible for all fiberglass repair work on and off the OV-10 aircraft. Excess chemicals used in the process are allowed to harden and are discarded in the trash. There are no floor drains in this section.

The 35 EMS Egress maintains the ejection seats on the F-4 and OV-10 aircraft. They perform spot cleaning and painting and consume chemicals in the process.

A washrack is shared by 27 TASS and 35 EMS at this facility. The washrack has a 1100 gallon above ground tank where concentrated aircraft surface cleaner is mixed with water. The dilution used is 7-16:1. Concentrations of soap are varied depending on who mixes it and a perception of the degree of cleaning necessary. Personnel also "hand mix" soap in buckets when the mixing tank is not functioning.

x. 144 FIW/ANG, building 761

The 144 FIW/ANG FIW Detachment is an Air Defense unit assigned to the First Air Force. Minor maintenance is performed on alert aircraft. This building is not sewered but uses a septic system for waste disposal.

y. 35 EMS Armament Systems, building 780

The armament systems branch is responsible for the maintenance and repair of weapon suspension equipment and the F-4 nose gun. A room with a 1,1,1 trichloroethane vapor tank, a VVL 800 oil tank, a PD-680 degreasing tank, a tank containing both PD-680 and oil, and hot water rinse area are used for gun cleaning. This room has a floor drain.

z. 20 CMV, building 785

The 20 CMV is a missile maintenance facility. This includes the assembly, disassembly, inspection, check out, stripping and painting of missiles. Six different work centers use this facility.

Stripping is accomplished by applying the methylene chloride stripper with a brush, letting it sit, and wiping it off with rags. Rags are placed in the trash while the stripping area is hosed down.

aa. 27 TASS AGE/37 EMS AGE, building 789

(1) Aircraft ground support equipment is repaired and maintained at this location. Battery acid is drained and neutralized and disposed of through the oil water separator into the sewer. Approximately 10 gallons per week of aircraft surface contact cleaner is used to clean equipment. This cleaner is generally mixed in a ratio of 11-39:1.

(2) The industrial waste disposal practices of these shops are summarized and have been included as Attachment 13. A summary of the usage of paint strippers on base is included as Attachment 14.

(3) A summary of the detergent use at George AFB during the survey has been included in this report in Attachment 15. The compositions of detergents have been included when known.

V. OBSERVATIONS AND CONCLUSIONS

A. Hazardous Waste Survey

1. Fire Department, building 723

On 22 Aug 86, during a refilling operation, five gallons of Aqueous Film Forming Foam (AFFF) was spilled on the pavement outside the Fire Department. According to standard practice, the spilled AFFF was contained and left on the pavement to evaporate. Unfortunately, an unexpected rain washed the AFFF into the sewer system. As a result, a new spill procedure was implemented immediately to contain future spills by using speedy dry to absorb the AFFF before placing it into a drum for disposal. Annsul AFFF is used at George AFB. This AFFF contains about 2% fluorocarbons, 4% surfactants, 27% diethylene glycol monobutyl ether, the rest water. The manufacturer of this AFFF claims it is biodegradable, probably based on the readily biodegradable nature of the diethylene glycol. However, the fluorocarbons are not. Significant quantities of AFFF will cause a stable foam in an activated treatment plant aeration basin. No AFFF should be allowed to enter the sewer from George AFB.

2. Aircraft Washracks

The base has two large outdoor washracks for aircraft, located at buildings 645 and 755. Discussions with several personnel working there indicated varying water to soap dilution ratios (from 1:1 to 16:1) were being used depending on who does the mixing. A meeting was held during the survey with maintenance and civil engineering personnel. Supervisors agreed to follow Technical Order 1-1-1 and assure soap dilution is kept between 7-16:1. The 37 EMS washrack, building 645, uses a foam machine to clean excessively dirty areas. This machine requires less soap to be used as the foam stays in place when applied. In contrast, conventional cleaning methods require soap to be continually applied during cleaning. The 37 EMS has one person in charge of soap distribution and mixing to assure a consistent soap mixture. The 27 TASS corrosion control supervisor stated he does not have enough personnel to assign a man to mix and distribute the soap. As a result, washing crews are responsible for diluting their own soap. In addition, the 27 TASS washrack's soap reservoir was not operating.

3. 37 CRS Engine Shop Washrack, building 686

Various priority pollutants (dich ·obenzene, dichloroethane, ethyl benzene, tetrachloroethene) were found in the mg/l range in multiple samples from this washrack in 1986 by VVWRA personnel. The dichlorobenzenes probably came from the carbon remover used before switching to B&B M47. The haloethanes and ethylenes probably came from rinsing filters cleaned with 1,1,1 trichlorethane or some other solvent used in the past. This separator is clogged with sludge which will continually adsorb and desorb these chemicals unless the sludge is cleaned out. According to pumping receipts, the oil/water separator for the washrack was last cleaned in Oct 85 and is on an annual schedule. The oil/water separator cleaning performed since December 1984 has been summarized and is included as Attachment 16.

4. 37 EMS Armament Shop, Building 559

The oil/water separator sample taken by the base bioenvironmental engineering section in August 86 showed priority pollutant zinc concentrations of 9.9 mg/l, 3.4 mg/l chromium, and a COD of 1800 mg/l. This is typical for corrosion control paint stripping. During the survey, it was revealed that shop personnel assumed that they were discharging into a holding tank instead of an oil/water separator. This discharge has been stopped. Currently, the only substances said to be discharged into the drains are aircraft soap and water. This oil/water separator was last cleaned in Oct 85 (Attachment 16).

5. Oil/Water Separator Characteristics

a. 831 Supply Fuels, building 552 (site 16) and building 708 (site 35)

The oil/water separator at building 552 contained an emulsion of fuels, oils, and soap. Even though this separator was recently pumped and is on a bimonthly cleaning schedule, Attachment 11 indicates gross levels of oil and grease, copper, and lead. These findings indicate the problem is

housekeeping during oil changes and engine overhauls and not an occasional JP-4 or oil spill.

The oil/water separator at the flightline fuel pumphouse, building 708, was full of JP-4 and according to Attachment 11 showed high levels of phenols. This separator was last cleaned in Oct 85 (Attachment 16) and was plugged at the beginning of the survey and remained plugged during the survey.

Both of these separators contained more fuels than would be associated with drips and slight spills. Oil/water separators of the design used at GAFB are inefficient at preventing JP-4 fuels from entering the sewer system, as the slightly water soluble components (i.e., benzene) of the fuel pass through. Also, soaps used to clean components and floors contain emulsifiers which tend to break down the oil/water interface in the separator, allowing minute globules of fuel or oil to enter the water phase.

b. 35 EMS Fabrication, building 652 (sites 22,23,24,25)

Attachment 11 reviews high concentrations of oil and grease, phenols, and metals (i.e., Cd, Cr, Pd, Zn) going into the sewer system. Furthermore, Attachment 10 shows the content of sites 22 and 23 to be a characteristic hazardous waste with respect to heavy metals. These findings indicate that the bimonthly cleaning schedule is ineffective; and, the major contributing activity is the rinsing operation after parts are stripped. The practice of placing parts on the floor and rinsing with water after stripping should be terminated. What is needed, is a rinsewater tank to contain the rinsewater. Also, the floor drain should be capped so that it can be used only when necessary. Finally, the paint booth cleanout must be closely observed and monitored to insure proper procedures are used to minimize chemicals washed down the oil/water separator, i.e., sludge and water from the paint booth.

c. Aircraft Washrack, building 645 (site 30); Aircraft Maintenance, buildings 682 & 683 (sites 30 & 31); AGE Washrack, building 832 (site 40)

All these sites showed high levels of oil and grease. Again, practices at these sites should be closely monitored to ensure good housekeeping practices are followed. In particular, the corrosion control operations where chemical strippers (e.g., containing 75% methylene chloride) are used should be controlled.

d. 37 and 35 EMS Fuel Cell Repair, building 685 A & B and C, (site 32)

According to Attachment 10, site 32 is a characteristic hazardous waste because of ignitability. Operations in this building include the use of JP-4, MEK, PD-680 and chemicals associated with corrosion control. The floor drains in this building should probably be capped and only opened for use when necessary.

e. Fire Department Training, building 849 (site 41)

Attachment 11 indicates this site may have been used for something other than fire training, since the separator contains a hazardous waste high in lead. Additional hazardous waste analyses are probably required to monitor and confirm the characteristic of this site. This site is not connected to the sewer system.

6. Waste Analysis

Currently, the base is performing waste analysis as required by their Part B permit and operations plan. However, as a quality control measure, the base should do periodic waste analysis of randomly selected drums. The responsibility for waste identification and classification rests with the waste generators. Thus, the waste generator inventories rather than tests the wastes going into the drums. Waste sampling is conducted when the waste contractor doubts the inventory or drums appear with unknown wastes. When a drum of this sort appears it is held at the Defense Reutilization Management Office pending the arrival of analytical results.

7. Hazardous Waste Program (Pickup, Disposal, and Storage)

George AFB is rather unique in that all waste is picked up by an on-base contractor, A/C Industrial Cleaning. The contractor's responsibilities include pumping tanks, collecting full drums from 30 accumulation sites, assuring the drums are properly labeled and manifested, and turning the drums in to DRMO.

The DRMO waste storage yard has three 6000 gallon waste storage tanks. Waste oils, PD-680, transmission fluids, and hydraulic fluids are stored in one tank before being sold as heating fuel. Synthetic waste oils are stored in another tank before being sold to a recycler. The third tank is used for overflow. In addition, drums of waste paints, thinners, etc., are placed on diked concrete pads until an off-base contractor can pick them up.

8. Aircraft Washing

Aircraft washrack activities were monitored during a mobility exercise from 25-27 August 86. During the exercise, aircraft surface contact cleaning compound usage was minimal. AGE equipment was washed at building 768 with zip wax soap, a general purpose cleaner, and at the 37 EMS washrack. At the 37 EM washrack, workers used buckets containing diluted (1:8) aircraft surface cleaning compound. The soap was applied with brushes.

The industrial detergent used most often at George AFB is aircraft surface contact cleaner. The surfactant used, sodium dodecyl benzenesolfonate is readily biodegradable according to the manufacturer, Eldorado Chemical Company, San Antonio TX and by tests performed by USAFOEHL for this report.

9. Hazardous Waste Training

George AFB has not held formal training for accumulation site managers since 1985. Formal training should be held as soon as possible and must be on-going to be effective. A formal training program consisting of slides and texts was prepared in 1985 by RTI and C.A. Hughes Computrac Inc., Triangle Park, North Carolina under a contract by HQ TAC/DEMU through the USAFOEHL. This program is not being used because the base does not feel it is an effective program.

10. Waste Sites

Most of the waste accumulation sites are uncovered and not secured. Anyone can dump anything into drums at unsecured accumulation sites. This may result in the mixing of nonhazardous wastes with hazardous wastes, causing more than is necessary to be disposed of as hazardous waste, or causing hazardous waste to be disposed of as nonhazardous, if no analysis is performed.

Many of the accumulation sites are uncovered. Given the high temperatures of the climate, volatile chemicals such as methylene chloride may bulge sealed drums, requiring repackaging for shipment. Finally, many accumulation sites do not have concrete pads and some of the ones that do are cracked. As a result, any leaks or spills would not be contained, resulting in soil contamination.

11. Disposal Practice

Several shops are disposing of empty paint spray cans as hazardous waste. The State of California has authorized Castle AFB to dispose of empty spray cans as nonhazardous waste in a local landfill.

12. Oil/Water Separators

Many oil/water separators have sand and sludge accumulations on the bottom, which serve to adsorb and desorb slightly soluble, organic chemicals. The separator at building 686 is noteworthy for the amount of sand contained in it. Besides being a sponge for organic chemicals, the sand reduces residence times, reducing the time oil or fuels have to separate, increasing the concentration of fuel in the effluent.

B. Wastewater Characterization

1. The BOD to COD ratio is commonly used to evaluate the industrial nature of a wastewater. The lower values indicate sewage of more industrial nature. The analysis of the data in Table 9 indicates the wastewater entering the plant from George AFB, Victorville, and Adelanto is similar in nature from a biodegradability standpoint.

Effluent from Hesperia may be the most industrial in nature, since it showed the highest concentrations of BOD and COD. Acetone is probably being discharged as well as a phenolic compound, probably from strippers or in industrial detergents.

Hesperia contributes 3.4% of the flow, 11% of the BOD and 8.1% of the COD loading to the plant. By comparison, George AFB contributes 18.4% of the flow, 19.2% of the COD and 20.7% of the BOD, placing it slightly higher than average for BOD and COD plant loading.

2. As shown by the results in Attachments 8 and 9, more fuel associated hydrocarbons, as measured by the total extractable hydrocarbon test and by EPA methods 624 and 625, are being discharged from George AFB than any other community monitored, indicating the inability of the oil/water separators in their present condition to control this discharge. Effluent limitations for oils and grease were exceeded at George 1.

Along with the discharge of fuels, other organic compounds, such as components in paint strippers, solvents and placticizers are being discharged. Methylene chloride, used in paint strippers, is regularly being discharged from both George 1 and 2. These appear to be the only sources of methylene chloride reaching the plant. There may be methylene chloride discharges from other sources; however, it may be volatilizing on its way to the plant. A total of 20 priority pollutants was detected in the discharge from George AFB.

3. Though the CTL report and VVWRA sampling efforts demonstrated the presence of priority pollutants in oil/water separators, industrial operations at the base were not modified to preclude the discharge of these chemicals into the sewer system. For example, methylene chloride was identified in significant quantities in the George effluent. This is in violation of the discharge limitations.

4. A clear indication that George AFB is discharging chlorinated hydrocarbons in violation of the discharge permit were the results from the total extractable halocarbon test (TOX). An average of 171 and 127 µg/l was found in the discharge from George 1 and George 2, respectively. No halogens were detected in any of the samples from the other communities. Paint strippers from 37 EMS Corrosion Control and other shops shown in Attachment 8 and chlorinated solvents, such as 1,1,1 trichloroethane used at the Engine shop, can be traced to discharges from George 1. The discharge from George 2 is harder to explain, and is left to base personnel to identify. Two possible sources may be inappropriate waste disposal practices by facility maintenance personnel or car or furniture paint stripping in the housing area, with the stripper being washed into a drain or sewer.

5. Effluent limitations for metals were not being exceeded by discharges from George AFB. Despite high concentrations of cadmium, lead, and zinc in several oil/water separators, the metals are remaining in the insoluble reduced state in the oil/water separators for the most part. The dilution of the nonindustrial wastewater is sufficient to prevent George AFB from exceeding its limitations.

6. Sulfides in the wastewater may be responsible for reducing the metals to the insoluble state. The base exceeded its sulfide limitation during this survey. So did every other community. Sulfides are usually formed in sewage from the anaerobic decomposition of sulfites (e.g., photo

processing wastes) or sulfates (e.g., battery acid wastes, water softening resin regeneration). Sewage may become anaerobic at places such as lift stations, oil/water separators, or sewer blockages, or where there is a long, slow run to the plant. Along with sulfides, hydrogen sulfide gas is formed. This extremely offensive smelling gas is a hazard to sewer workers, from its explosive and toxic properties.

7. The surfactant (MBAS) limitation of 2.0 mg/l is exceeded at both George 1 and 2. However, every other community's discharge, except Oro Grande and Adelanto, exceeded this limit as well. Average levels of 5.3 and 2.3 were found from George 1 and George 2, respectively. The other communities were in this same range, as shown by Attachment 7. Victorville contributes double the surfactant loading of George AFB. The hazardous waste survey and the biodegradability survey showed that the base has been using biodegradable detergents for aircraft and vehicle washing and that these detergents should not cause a foaming problem to a properly operating activated sludge plant. George AFB needs to reduce the amount of detergent used or pretreat the washrack effluents in the case of the discharge from George 1, so that it complies with the discharge limitations. Then there should be no link between detergent use and plant foaming problems.

8. It was hoped that the VVWRA would have provided pretreatment limitations for the base in time to be incorporated into the conclusions and recommendations of this report. They did not. Therefore, EPA effluent guidelines and standards for pretreatment of existing sources, as contained in applicable parts of 40CFR Subchapter N will be used, as well as VVWRA Ordinance 80-19. Until VVWRA pretreatment limitations are received, the shops needing pretreatment and the type of pretreatment required are speculative.

By the compounds found in the wastewater characterization and hazardous waste survey, SBRs for the removal of petroleum products (flotation), metals, (flocculation, coagulation, sedimentation), organics, detergents, sulfides (aerated biological), and priority pollutant removal (activated carbon) could be necessary.

Based on the results of the survey, the effluents from the following operations could be considered as candidates for pretreatment:

a. Fuel Truck Maintenance, building 552

b. 37 CAS Engine Shop Washrack, building 686

c. 37 EMS Armament Shop, building 559

d. 35 EMS Fabrication, building 652

e. Aircraft Maintenance, buildings 682, 683

f. 37 and 35 EMS Fuel Cell Repair, building 685

The effluent from the washracks should not need pretreatment if the discharge of oils can be controlled, and the washracks used for washing only. Upgrading

the API type washrack separators at major use areas like buildings 645, 755, and 832 with coalescing plate type separators would increase oil/water separation efficiency greatly. Some manufacturers claim effluent concentrations in the 10-20 ppm range (8), considerably lower than the 500 mg/l range of an API separator.

9. According to Strom and Jenkins (6), the presence of Nocardia in the biomass is the apparent causitive agent of thick, viscous, highly stable brown foam. As Jenkins (5) indicated, VVWRA has adopted a mode of operation that effectively reduces the activated sludge system by 33%. He states that this mode of operation is necessary to provide protection for the activated sludge from toxic spills. Without the mixed liquor (biomass), and the aeration in the preaeration tank, VVWRA was able to demonstrate white foam. The whole purpose of biodegradable detergents is for the surfactants in the detergent to be broken down by the biomass. Remove the biomass, as VVWRA plant personnel have done, and the biodegradable detergents are not broken down, producing the billowy white foam. Aside from the demonstation of the white foam, VVWRA had effectively reduced the concentration of biomass, as measured by mixed liquor suspended solids (MLSS) from presurvey levels of approximately 4000 mg/l to levels approximately 3000 mg/l, hence lowering the concentration of Nocardia. The foam decreased significantly.

There is no reason to question Jenkins' contention that non-biodegradable surfactants significantly compound a Nocardia problem. This is perhaps what had happened following the discharge of AFFF. The surfactant in AFFF is not biodegradable, and may have significantly added to the foam already existing from the Nocardia problem.

VI. RECOMMENDATIONS

1. AFFF should not be discharged into the sewer system. This compound is not amenable to biological treatment, and should be disposed of as hazardous waste, or pretreated, however, treatability data are lacking. Possible processes include oxidation possibly by ozonation, or activated carbon absorption.

2. If process changes or product substitution cannot be made to completely eliminate the discharge of chemical constiuents in concentrations in violation of discharge limitations, programing should proceed for the implementation of a pretreatment system for George AFB. Flows should be measured for at least seven days at the operations picked as candidates for pretreatment. This will serve as the basis for design for the pretreatment system, along with the characterizations contained in this report.

3. Since the base effluent is exceeding MBAS limitations, recommend reducing the amount of nonessential washing, (vehicle, floors, equipment). Limitations are not being grossly exceeded and could be brought into compliance through the implementation of measures controlling "washing for appearance". Washing should only be performed with biodegradable detergents. Care should be taken to assure that new detergents, especially those which are purchased locally, are biodegradable through a review of their constituents or by testing data supplied by the manufacturer.

References

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3. Fishburn, Gary A., "Characterization of Wastewater Discharges At George AFB CA", USAFOEHL Report No. 80-43, USAF Occupational and Environmental Health Laboratory, Brooks AFB TX, 1980.

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5. David Jenkins and Associates Inc., Letter to Mr K. Israel, Victor Valley Wastewater Reclamation Authority, 28 October 1986.

6. Strom, P.F. and David Jenkins, "Indentification and Significance of Filimentous Microoganisms in Activated Sludge," Journal WPCF, Vol. 56, 5,449-459.

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8. General Electric Co., "Coalescing Plate Oil/Water Separators", PIBR 160R, 1978.

(ORDINANCE NO. 001)

ORDINANCE NO. 80-19

RULES AND REGULATIONS

FOR

SEWERAGE SERVICE

VICTOR VALLEY WASTEWATER RECLAMATION AUTHORITY

ADOPTED: 10-8-80

AMENDED: 11-25-81

AMENDED: 6-3-82

AMENDED: 11-17-83

AMENDED: 6-28-84

AMENDED: 6-27-85

Attach 1

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SECTION 1

GENERAL

The purpose of these Rules and Regulations is to provide for the maximum possible beneficial public use of the Joint Powers Agreement (JPA) facilities through adequate regulation of sewer design and construction, sewer use and industrial wastewater discharges; to provide equitable distribution of the costs of the regional system and to provide procedures for complying with requirements placed upon the Authority by other regulatory agencies.

The provisions of these Rules and Regulations shall apply to the direct or indirect discharge of all liquid carried wastes to facilities of the JPA by Member Agencies and George Air Force Base. If a conflict should arise between these Rules and Regulations, and the service agreement with GAFB, the service agreement shall govern. These Rules and Regulations among other things provide for the regulation of sewer service and construction in areas within the JPA, the quality and quantity of discharged wastes, the degree of waste pretreatment required, the issuance of permits for wastewater discharge and of other miscellaneous permits, and the establishment of penalties for violation.

Unless otherwise provided herein, the Victor Valley Wastewater Reclamation Authority (Authority), shall administer, implement and enforce the provisions of this document. The effective date of these Rules and Regulations as amended shall be November 25, 1981. Each Member Agency will provide its own design and construction specifications for local systems. These specifications will be regulated and enforced individually by the Member

Agencies. The regulation of inflow into the sanitary sewer systems of each Member Agency is available under the following conditions:

1) Domestic waste hook-up will be regulated by a permit procedure by each Member Agency.
2) Industrial/commercial waste hook-up will be regulated by the individual agencies, however, all discharge must satisfy the standards of Section 8 of this ordinance as adopted and as hereafter amended.

The Authority is a Joint Powers Agency created expressly for the purpose of treatment of wastewater and the ultimate disposal of effluent and solids in compliance with waste discharge requirements set from time to time by the California Regional Water Quality Control Board (CRWQCB), Lahontan Region, and any and all applicable Federal, State and local statutes, ordinances, regulations, and other requirements.

Sewerage service by the Authority, subject to the availability of facilities, adequate capacity in facilities, funds or financing for the construction thereof, or all of the foregoing, is available to member entities on the terms and conditions herein established. The availability of such service is to be furnished to each Member Agency on the same basis, so that all such Agencies may be served in an equal and comparable manner.

The Authority Financial and Revenue Plan, and the Financial Policy Resolution 81-10 dated November, 1981, latest version as approved by the Authority, shall indicate the means of funding capital and operational costs of the regional system. It is additionally the intent of the Authority to utilize

reclaimed water to the maximum beneficial advantage of the community. This use may encompass all or a combination of ground water recharge, landscape irrigation, agricultural irrigation, industrial process water, recreational impoundment, or other beneficial use thereof.

The Authority intends to provide regional sewerage service to its Member Agencies through sound fiscal planning so as to provide capacity at all times to meet the growth of the area. The Authority, however, urges that strong control measures be adopted within each Member Agency to encourage water conservation. In this manner, the Authority would not only provide for reuse of the treated wastewater, but even more importantly, reduce the consumptive use of the high quality drinking water available within its boundaries.

SECTION 2

JURISDICTION

Pursuant to the regional "project concept," the "contracting communities" or "Member Agencies" will collect sewage through locally owned and operated municipal collector systems within their respective boundaries and transmit same to the Authority owned and operated regional system, via the Authority's interceptor pipelines, for treatment and ultimate disposition of the treated effluent.

Except in those instances wherein there is a direct "Service Agreement" between the Authority and the Discharger (such as the GAFB situation), the Member Agency shall be the entity in direct contact with and under contract with the Discharger. The Authority shall be in direct contact with and under contract with the Member Agency.

Notwithstanding anything contained herein which may appear to be to the contrary, the Member Agencies shall have and retain exclusive jurisdiction and control over their local collector systems and the Authority shall have and retain exclusive jurisdiction and control over the regional system.

Whenever power is conferred upon "the Member Agency and/or the Authority" by this Ordinance, such power shall be construed to vest first and primarily in the Member Agency to the extent that the subject matter thereof deals with a local collector system matter.

All contracting communities recognize that the violation of any rule or regulation regarding the use of the regional system by a contracting

community or any of its dischargers could jeopardize the integrity and operation of the regional system and the Authority's ability to provide regional wastewater service to the entity in question and to the other contracting communities and their dischargers. Accordingly, each contracting community pledges to comply with, honor and enforce all rules and regulations in force relating to the regional system within their respective boundaries.

SECTION 3

DEFINITIONS

Unless otherwise defined herein, terms related to water quality shall be as adopted in the latest edition of Standard Methods for the Examination of Water and Wastewater, published by the American Public Health Association, the American Water Works Association and the Water Pollution Control Federation. The testing procedures for waste constituents and characteristics shall be as provided in 40 CFR 136, (Code of Federal Regulations; Title 40; Protection of Environment; Chapter I, Environmental Protection Agency; Part 136, Test Procedures for the Analyses of Pollutants), or as specified by the appropriate regulatory agency. Other terms not herein defined are defined as being the same as set forth in the International Conference of Building Officials Uniform Plumbing Code, latest edition. The terms hereinafter set forth unless otherwise specified shall have the following meanings:

(1) Authority shall mean the Victor Valley Wastewater Reclamation Authority.

(2) Authority Interceptor shall mean those interceptor sewers owned by the Authority for the conveyance of liquid wastes from Member Agency collection systems to the Victor Valley Wastewater Reclamation Facility.

(3) Authority Sewerage Facility shall mean any property belonging to the Authority used in the treatment, reclamation, reuse transportation, or disposal of wastewater.

(4) Biochemical Oxygen Demand (BOD) shall mean the measure of decomposable organic material in domestic or industrial wastewaters as represented by the oxygen utilized in standard laboratory procedure in five (5) days at twenty (20) degrees Centigrade expressed in terms of mass per volume (mg/l).

(5) Building Sewer - Sanitary shall mean a sewer pipe receiving flow from a single building and connecting to a sewer main or lateral, and constructed on private property, except for street crossing.

(6) Chemical Oxygen Demand (COD) shall mean the measure of chemically decomposable material in domestic or industrial wastewater as represented by the oxygen utilized in terms of mass per volume (mg/l) determined by standard methods used for the examination of wastewater.

(7) Class I Discharger shall mean any collection system non-residential discharger who:

(a) has a discharge flow of up to 10,000 gallons or more per normal work day or 3 million gallons or more per year; and

(b) has a discharge of wastewater that has a strength significantly (50%) greater than domestic sewerage (domestic sewerage will be considered to have a BOD of 200 mg/l and suspended solids of 250 mg/l); or

(c) has a discharge of components which may exceed the parameters as specified in Section 8.3.8 herein, entitled "Wastewater Strength Limitations."

(8) Class II Discharger shall mean a collection system non-resident discharger who discharges more than its proportionate share of

suspended solids and/or biochemical oxygen demand; who discharges more than 10,000 gallons per day (or 3 million gallons per year) but less than 25,000 gallons per day (or 6 million gallons per year) and who is not required to obtain a Class I Permit.

(9) Coliform shall mean any number of organisms common to the intestinal tract of man and animals whose presence in sanitary sewage is an indicator of the suitability of a particular water for domestic, dietetic, or other uses.

(10) Collection Sewer shall mean a public sewer owned and operated by a Member Agency, whose primary purpose is to collect wastewaters from individual point source discharges.

(11) Combined Sewage shall mean a combination of both wastewater and storm or surface water.

(12) Combined Sewer shall mean a sewer intended to receive both wastewater and storm or surface water.

(13) Commercial Discharger: All retail stores, restaurants, office buildings, laundries, and other private business and service establishments, including churches and lodges.

(14) Commission shall mean the Board of Commissioners of the Authority.

(15) Compatible Pollutant shall mean BOD, suspended solids, pH, coliform bacteria, and such additional pollutants as are now or may be in the future specified and controlled by the Authority's permit, for its wastewater treatment works as said works have been designed and are operated to reduce or remove such pollutants.

(16) Connection Fee: A fee paid by a new system discharger for the capital costs of capacity in the regional wastewater system.

(17) Construction Drainage shall mean water accumulated in excavations; water taken from the ground through a well-point, underdrain or other dewatering system; water accumulated as a result of grading; and all other drainage associated with construction operation.

(18) Control Manhole shall mean a structure specially constructed for the purpose of measuring flow and sampling of the wastes.

(19) Critical Discharger shall mean any discharger whose classification is identified in the Standard Industrial Classifications (SIC) Manual in any of Divisions A, B, D, E, and I, or who has a discharge flow of 25,000 gallons or more per average work day, whose discharge contains toxic pollutants, or whose discharge may have significant impact, either singly or in combination with other contributing users, on the treatment or collection system.

(20) Developments shall mean parcels of land on which dwelling units, commercial, or industrial buildings, or improvements are built.

(21) Discharger shall mean any person that discharges or causes a discharge of wastewater directly or indirectly to a Member Agency sewer.

(22) Dissolved Solids shall mean the residues of the dissolved constituents in water.

(23) Easement shall mean an acquired legal right for the specific use of land owned by others.

(24) Effluent shall mean water discharged from the Victor Valley Wastewater Plant.

(25) Floatable Oil shall mean oil, fat or grease in a physical state such that it will separate by gravity from wastewater by treatment in a pre-treatment facility approved by the Member Agency.

(26) Force Main shall mean a pipe in which wastewater is carried under pressure.

(27) Garbage shall mean solid wastes from the domestic and commercial preparation, cooking and dispensing of food, and from the handling, storage and sale of food.

(28) General Manager shall mean the General Manager of the Victor Valley Wastewater Reclamation Authority.

(29) Incompatible Pollutant shall mean any non-treatable waste product including non-biodegradable dissolved solids.

(30) Industrial Plant shall mean any facility which discharges industrial wastes. Each industrial plant will be considered and analyzed individually even though an owner may operate two or more industrial plants within the Authority area. A multi-building industrial plant located on a single site shall not be arbitrarily divided into separate units for the purpose of obtaining additional deductions and exemptions.

(31) Industrial Sewer shall mean a sewer owned and operated by an industry.

(32) Industrial Waste Enforcement Officer shall mean a person authorized by the member agencies to inspect wastewater generation, conveyance, processing, and disposal facilities.

(33) Industrial Wastewater shall mean all water carried wastes and wastewater of the community excluding domestic wastewater and shall include all wastewater from any producing, manufacturing, processing, institutional, commercial, agricultural, or other operation where wastewater discharged includes significant quantities of wastes of non-human origin.

(34) Industry shall mean any establishment as listed, but not limited to, the Standard Industrial Classification Manual, 1972 Edition, or revision thereof, which is categorized in Division A, B, D, E, or I.

(35) Infiltration shall mean the water unintentionally entering the public sewer system, including sanitary building drains and sewers, from the ground, through such means as, but not limited to, defective pipes, pipe joints, connections, or manhole walls.

(36) Infiltration/Inflow shall mean the total quantity of water from both infiltration and inflow without distinguishing the source.

(37) Inflow shall mean the water discharge into a sanitary sewer system, including building drains and sewers, from such sources as, but not limited to, roof leaders, cellar, yard, and area drains, foundation drains, unpolluted cooling water discharges, drains from springs and swampy areas, manhole covers, cross connections from storm sewers and/or combined sewers, catch basins, storm waters, surface

and is distinguished from, infiltration.)

(38) Interceptor Sewer shall mean a sewer whose primary purpose is to transport wastewater from the Member Agencies collection sewers to the Authority's treatment facility. See (2) above.

(39) J.P.A. shall mean members included in the Joint Exercise of Powers Agreement comprised of the following parties: Mojave Water Agency, City of Victorville, Victorville Sanitary District, Apple Valley County Water District, Hesperia Water District, City of Adelanto, and County Service Area #42 or the entity known as VVWRA, however constituted.

(40) Local Sewering Agency shall mean the Member Agency as designated in the Joint Powers Agreement.

(41) Maintenance shall mean keeping the sewer lines, sewer systems, sewer facilities or sewage works and structures in satisfactory working condition and good state of repair, (including but not limited to preventing any obstructions or extraneous materials or flows from entering said facilities, protecting said facilities from any damage, and keeping same free from defects or malfunctions), and making necessary provisions and taking necessary precautions to assure that said sewer facilities are at all times capable of satisfactorily performing the services, and adequately discharging the functions and producing the final results and purposes said facilities are intended to perform, discharge or produce.

(42) Mass Emission Rate shall mean the weight of material discharged to the sewer system during a given time interval. Unless otherwise specified, the mass emission rate shall mean pounds per day of a particular constituent or combination of constituents.

(43) "May" is permissive (see "Shall," (69).

(44) Member Agency shall mean public functional entities that are legally accepted as members of the Victor Valley Wastewater Reclamation Authority and for the purpose of this document shall include George Air
Force Base.

(45) Milligrams per Liter shall mean a unit of the concentration of water or wastewater constituent. It is 0.001 g of the constituent in 1,000 ml of water. It has replaced the unit formerly used commonly, parts per million, to which it is approximately equivalent in reporting the results of water and wastewater analysis.

(46) National Pollution Discharge Elimination System (NPDES) shall mean the Federal pollution regulation system as detailed in Public Law 92-500, Section 402.

(47) Natural Outlet shall mean any outlet, including storm sewers and combined sewer overflows, into a water course; pond, ditch, lake or other body of surface or ground water.

(48) Normal Domestic Sewage shall mean the water carried wastes produced from non-commercial or non-industrial activities and which result

...processes. Discharge wastes strength shall be considered to average 200 mg/l BOD and 250 mg/l Suspended Solids at a discharge rate of 70 gallons per capita per day. This loading equates to 0.12 pounds of BOD and 0.15 pounds of Suspended Solids per capita per day.

(49) Normal Working Day shall mean the period of time during which production and/or operation is taking place.

(50) NPDES Permit shall mean the National Pollutant Discharge Elimination System Permit that is issued by the USEPA setting the limits on constituents that the permittee may legally discharge. The limits are set in both concentration and quantity.

(51) Owner shall mean any individual, firm, company, association, society, corporation or group discharging any wastewater to the wastewater treatment facility.

(52) Person shall mean an individual or entity, public or private.

(53) pH shall mean the logarithm of the reciprocal of the quantity of hydrogen ions in moles per liter of solution used in expressing both acidity and alkalinity on a scale ranging from 0 to 14 where 7 represents neutrality, numbers less than 7 increasing acidity, and more than 7 increasing alkalinity.

(54) Pollutant shall mean any constituent or characteristic of wastewaters on which a discharge limitation may be imposed either by the Authority or the regulatory bodies empowered to regulate the Authority.

(55) Population Equivalent shall mean a term used to evaluate the impact of industrial or other waste on a treatment works or stream. One population equivalent of normal domestic sewage is 70 gallons of sewage per day, or 0.12 pounds of BOD or 0.15 pounds of Suspended Solids. The impact on a treatment works is evaluated as the equivalent of the highest of the three parameters. Impact on a stream is the higher of the BOD and Suspended Solids parameters.

(56) Pretreatment shall mean treatment that the Authority or the Member Agency may require prior to permitting discharge of sewage into any JPA sewerage facility to insure compliance with any and all applicable Federal, State, or local statutes, ordinances, regulations, contracts, or all of the foregoing, individually or collectively, or if determined by the Authority to be necessary to protect the facilities of the Authority from any possible present or future damage.

(57) Public Agency shall mean the Federal Government, the State, or any City, County, District, J.P.A. or other public agency or body duly organized under the laws of the State of California or of the U.S.A.

(58) Public Sewer shall mean a sewer owned and operated by the Authority, a City or other local sewering agency, which is tributary to treatment facilities operated by the Authority.

(59) Radioactive Material shall mean material containing chemical elements that spontaneously change their atomic structure by emitting any particles, rays or energy forms.

(60) Regulatory Agencies are those public agencies legally constituted in the State of California to protect the public health and water quality, such as the Department of Health Services, the California Regional Water Quality Control Board, Lahontan Region, and the San Bernardino County Health Department.

(61) Sampling and Evaluation Program shall mean the determination of mass emission of constituents or other conditions specified in the discharger's permit over a period of not less than one normal working day or more than 12 normal working days.

(62) Sampling Chamber or Manhole: In order to provide for accurate sampling and measurement of industrial wastes, each industrial plant shall provide an industrial waste outlet sewer sampling chamber to be located outside or near its plant boundary line where feasible. If inside the plant fence, there shall be a locked gate near the sampling chamber with a key furnished to the user. There shall be ample room in or near each sampling chamber in order to accurately sample and composite the samples for analysis. Each sampling chamber shall contain a permanent or portable Parshall flume, Palmer-Bowlus, or similar device, with a recording and totaling register for measurement of the liquid quantity.

~~(63)~~ Sanitary Sewers shall mean a sewer which carries sanitary and industrial wastes, and to which storm, surface and ground water are not intentionally admitted.

(64) Service Agreements shall mean the contract documents common to member agencies, and executed during formation of J.P.A. dated November 1976.

(65) Sewage shall mean wastewater.

(66) Sewage Lift Station shall mean a station positioned in a sewer system at which wastewater is pumped to a higher level.

(67) Sewer shall mean a pipe or conduit that carries wastewater or drainage water.

(68) Sewerage System shall mean a network of wastewater collection, conveyance, treatment and disposal facilities interconnected by sewers, and owned by the Authority or the member agencies.

(69) "Shall" is mandatory (see "May," (43).

(70) Shredded Garbage shall mean garbage that has been shredded to such a degree that all particles will be carried freely under the flow conditions normally prevailing in public sewers, with no particle greater than ½ inch (1.25 centimeters) in any dimension.

(71) Significant Industry shall mean any industry that will contribute greater than 10 percent of the design flow and/or design pollutant loading of the treatment works.

(72) Solid Wastes shall mean the non-liquid carried wastes normally considered to be suitable for disposal with refuse at sanitary landfill refuse disposal sites.

(73) Suspended Solids or "Suspended Matter" shall mean the insoluble solid matter suspended in wastewater that is separable by laboratory filtration.

(74) Total Organic Carbon (TOC) shall mean the measure of total organic carbon in domestic or other wastewater as determined by the appropriate testing procedure.

(75) Total Solids shall mean the sum of suspended and dissolved solids.

(76) Toxic Amount shall mean concentration of any pollutant or combination of pollutants which upon exposure to or assimilation into any organism will cause adverse effects, such as cancer, genetic mutations and physiological manifestations, as defined in standards issued pursuant to Section 307(a) of PL 92-500.

(77) Trade Secrets shall include but not be limited to any formula, plan pattern, process, tool, mechanism, compound, procedure, production data, or compilation of information which is not patented, which is known only to certain individuals within a commercial concern who are using it to fabricate, produce, or compound an article of trade or a service having commercial value, and which gives its user an opportunity to obtain a business advantage over competitors who do not know or use it.

(78) Tributary Sewerage System shall mean any sewerage system under the jurisdiction of a Member Agency that is tributary to the Authority's sewerage system and is connected thereto.

(79) Uncontaminated Water shall mean any wasted water of the community not contaminated or polluted with wastewater, and which is suitable or could readily be made suitable for discharge to the municipal storm water drainage system.

(80) User shall mean a Member Agency that discharges, causes, or permits a discharge directly or indirectly to the J.P.A. Interceptor. (21) above)

(81) Waste shall mean sewage and any and all other waste substances, liquid, solid, gaseous, or radioactive, associated with human habitation, or of human or animal origin, or from any producing, manufacturing or processing operation of whatever nature, including such wastes placed within containers of whatever nature, prior to and for the purpose of disposal.

(82) Wastewater shall mean waste and water, whether treated or untreated, discharged into or permitted to enter an Authority or Member Agency sewer.

(83) Wastewater Constituents and Characteristics shall mean the individual chemical, physical, bacteriological, and radiological parameters, including volume, flow rate, concentration and such other parameters, that serve to define, classify, or measure the quality and quantity of wastewater.

(84) Wastewater Treatment shall mean the structures, equipment and processes require to collect, transport and treat domestic and industrial wastes and dispose of the effluent and accumulated ~~residual~~ solids.

(85) Will Serve Letter shall mean written authorization from the Authority or its representative authorizing contributions of

sewerage from a Class I or Class II user into the tributary sewerage system.

SECTION 4

AREA SERVED

The Rules and Regulations set forth herein pertain to sewer service to land or improvements, or both, lying within the boundaries of the Authority, unless otherwise stated.

Per J.P.A. Agreement, Section A, Paragraph 3, "The territorial boundaries may be changed from time to time upon the approval of two-thirds (2/3) of the members of this Agency." Section A, Paragraph 5 of the J.P.A. further states in regard to eligibility for membership (other than those specified) that "(h) other such public agencies as may hereafter be declared eligible by unanimous vote of existing members," and Paragraph 6 states, "in connection with the admission of any additional eligible public agency after formation of the Agency, each of the existing members and the prospective member for contributions toward past and present agency and project expenditures. Resolution 81-10 of the Authority further provides:

> "Before any territory outside the boundaries of the Authority may be added or service may be provided to it, such area must first be annexed to the boundaries of a contracting community and must also be annexed to the boundaries of the VVWRA. Annexation to the VVWRA may only be accomplished through satisfaction of all applicable legal prerequisites and payment of applicable fees and charges."

Therefore, in accordance with the J.P.A. and the policy resolution a public entity or applicant owner of property outside of the boundaries of the

Authority must petition for inclusion of eligibility for membership or apply for service through a J.P.A. member and request the service area to be expanded. Conditions of service must be reviewed first by the member entity, or entities involved, and then by the J.P.A. since "annexation to the VVWRA may only be accomplished through satisfaction of all applicable legal prerequisites and payment of applicable fees and charges." Such costs will be reviewed by a consultant selected by the Authority and approved at a regular Commission meeting.

5.1 SERVICE CONDITIONS

Sewer service shall be provided by the Authority only if the service area is included within or added to the Member Agency's and the Authority's boundaries and the applicant meets the requirements of the Authority and the interested Member Agency. Properties may from time to time petition the Member Agency and the Authority for annexation in compliance with Service Agreements, the J.P.A., and the Authority's Rules and Regulations. Sewer conveyance, treatment and disposal shall be available only in accordance with the Authority's and the Member Agency's Rules and Regulations, as well as applicable Federal, State and local statutes, ordinances, regulations, and contracts, and other requirements. This includes, but is not limited to the California Water Code, the California Administrative Code, and regulations imposed by the California Regional Water Quality Control Board - Lahontan Region, and State and local health departments, as well as the terms of any service agreement and permit issued by the Authority and/or the Member Agency. Any such permit may be revoked by the party granting same and thereupon all such sewer service shall cease in the manner provided in such granting entity's Rules and Regulations.

5.2 APPLICATION PROCEDURE

A Class I, Class II, or critical discharger will have completed the following steps prior to direct or indirect sewerage dishcarges into the Authority's facilities:

Advance Planning

a) Letter of intent to the Member Agency outlining projected plans of development followed by;

b) Written response from the Member Agency.

Pre Initiation

c) Application for service in accordance with Section 7.4.3.

d) Receipt of approved Certificate of Adequacy and permit from the Member Agency and a "Will Serve Letter" from the Authority.

e) Five-day notification to the Member Agency prior to commencement of construction.

Construction

f) Request for final acceptance of completed works.

g) Receipt of written authorization, from the Member Agency, to connect to facilities that will contribute to the Authority's system.

h) The Member Agency shall be responsible for informing the Authority of planned developments that may significantly affect the operational or capacity limits of the Authority's facilities. Additionally, the Member Agency must have obtained a "Will Serve Letter" from the Authority prior to issuing a "Certificate of Adequacy" to a Class I, a Class II. or a critical discharger.

i) GAFB will notify the Authority at the earliest stages of planning for new or modified facilities which meet the definition of Class I, Class II or critical dischargers. The Authority will notify GAFB if the proposed facility may significantly affect the

Servce Agreement.

5.3 DESIGN AND CONSTRUCTION CRITERIA

Design criteria as submitted in the letter of intent and service application shall conform to the following:

The average flow rate is to be determined based on good engineering practice. The ranges shown in Plate I may be used as a guide; however, flows outside of these ranges may occur. If flows are used which are less than those listed, the Authority's approval must be obtained in advance of design.

The peak sewage flow rate shall be obtained by entering the chart with average daily flow rates.

For hydraulic design, use Manning's "n" = 0.013 or Hazen-Williams "C" = 100. For pipe sizes 10" or less in diameter, design pipe so peak flow rate will be carried when pipe is flowing at one-half depth. Discharge at one-half depth equals one-half discharge when full and velocity equals velocity when full. Tables and formulas to find slope may be used by entering with two times the peak flow rate.

For pipe 12" and larger in diameter, design pipe so peak flow will be carried when pipe is flowing at 2/3 depth. Discharge at 2/3 depth equals 3/4 discharge when full and velocity equals 1.16 times velocity when full. Tables and formulas to find slope may be used by entering with 1.33 times the peak flow rate.

All applications shall be accompanied by a "Certificate of Adequacy of Sewerage System." See Plate II.

5.4 ILLEGAL CONNECTIONS

Only Member Agencies or entities under contract with the Authority (i.e. GAFB) may make connection to interceptor sewers of the Authority. Specifically, but not by way of limitation, as to any connection to the Member Agency's sewerage facilities, no roof downspouts, exterior foundation drains, areaway drains, or other sources of surface runoff or ground water shall be connected to a building sewer or building drain that may contribute to the tributary sewer system.

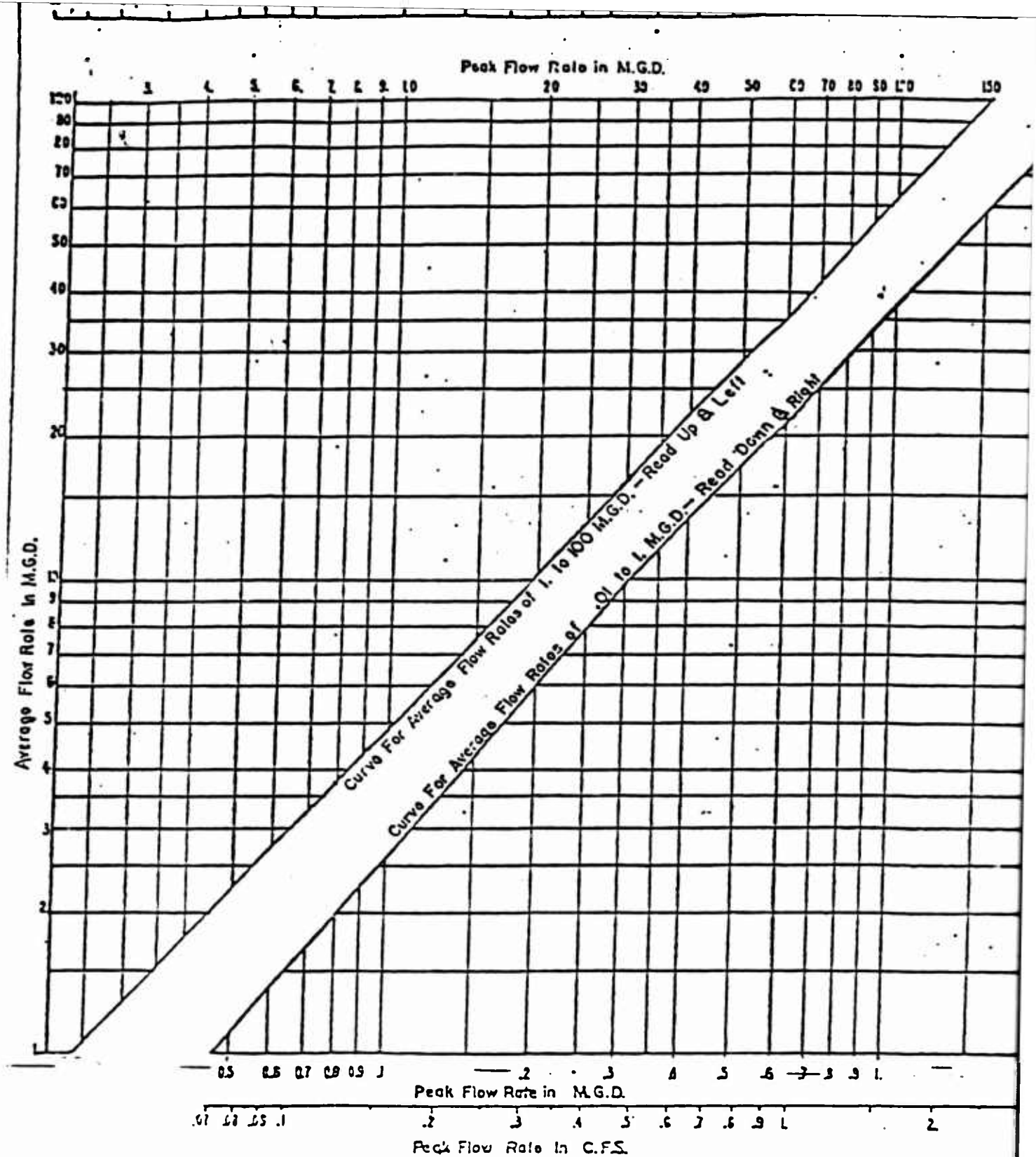
Peak Flow Rate in M.G.D.
Average Flow Rate in M.G.D.
Curve For Average Flow Rates of 1. to 100 M.G.D. – Read Up & Left
Curve For Average Flow Rates of .01 to 1. M.G.D. – Read Down & Right
Peak Flow Rate in M.G.D.
Peak Flow Rate in C.F.S.

PLATE I

CERTIFICATE OF ADEQUACY OF SEWERAGE SYSTEM

It is hereby understood by all persons signing this certificate that the Member Agency will not consider allowing use of its facilities by this land development without having received the representations contained herein.
I certify that the following statements are true:

1. I hold a currently valid certificate of registration as a Civil Engineer issued pursuant to Section 6700 et. seq. of the Business and Professions Code, State of California. I am further qualified by experience to design sewage systems.

2. The sewerage system has been designed in accordance with good engineering practice and meets all of the requirements of Victor Valley Wastewater Reclamation Authority and the Member Agency having jurisdiction.

3. All design criteria and the materials and methods of construction specified for use in this sewerage system meet or exceed standards adopted and approved by the Victor Valley Wastewater Reclamation Authority and the Member Agency.

_____ DATE _____
Signature

4. The Member Agency hereby agrees that adequate capacity is available or will be made available to accept sewerage contributions from this development within _____ year(s) from the execution date of this certificate.

_____ DATE _____
Member Agency Signature

5. All improvements shown on drawings numbered _____ have been constructed and equal or exceed the standards adopted and approved by the Member Agency.

_____ DATE _____
(Signature required upon completion of the sewerage system of this development and prior to sewage contributions to Victor Valley Wastewater Reclamation Authority systems.)

PLATE II

SECTION 6

FACILITIES DESIGN AND CONSTRUCTION

6.1 GENERAL

All sewers shall be constructed according to the requirements, conditions, and standards set forth in a separate supplement hereto, as adopted and revised by the Authority from time to time, entitled "Standard Specifications for Public Works Construction" with extension and revisions, which document is on file at the office of the Authority, and by this reference is incorporated herein.

6.2 MEMBER AGENCY SEWER

Any sewer collection and trunk system facilities, to the extent determined by the Member Agency, required to serve within developments of property within the Member Agency jurisdiction shall be provided as determined by the Member Agency. The Authority will assume responsibility for providing interceptor sewers, regional wastewater treatment, and disposal of liquid and solid wastes.

SECTION 7

FACILITIES OPERATION

7.1 INTERCEPTOR SEWER AND SEWAGE TREATMENT AND DISPOSAL

Operation, maintenance, and surveillance of all of the Authority's interceptor sewers and sewage treatment and disposal facilities, including, but not limited to, interceptor sewer, sewage treatment facilities and effluent disposal facilities including all interceptors, reservoirs, pumping stations, force mains, flow meters/monitoring stations and other appurtenances and property shall be under the management and control of the Authority. No other persons except authorized representatives of the Authority shall have any right to enter upon, inspect, operate, adjust, change, alter, move, or relocate any portion of the foregoing or any of the Authority's property. In the event that such trespass should occur, it shall be a misdemeanor and all charges and penalties provided for in this ordinance shall be applicable and may be imposed and collected. Also such action shall be in violation of any and all applicable Federal, State, and local statutes, ordinances, regulations, and other requirements.

7.2 MEMBER AGENCY FACILITIES

The operation, maintenance and surveillance of onsite sewage collection and the Member Agency's collection system is the responsibility of the Member Agency.

SECTION 8

INDUSTRIAL WASTE DISCHARGE

8.1 GENERAL

The Victor Valley Wastewater Reclamation Plant is a regional facility designed and constructed to collect and process liquid wastes from Member Agencies and George Air Force Base per approved service agreements and contracts. These facilities, constructed to meet federal and state discharge requirements, have specific limitations on biological loadings, inert loadings, volumes of flow, and toxicity concentrations that will permit operation of the facilities without serious violation of the discharge requirements. This Ordinance defines these limitations, establishes enforcement procedures, and assigns permit charges.

Routine discharge permits and charges, as established by this Ordinance, will be issued and monitored by the Member Agencies in their respective jurisdictions. Non-routine permits or contested permits will be presented to the Board of Commissioners for determination. A summary of all permit activity by each Member Agency will be included in a monthly report to the Commissioners.

8.2 INDUSTRIAL WASTE REQUIREMENTS

8.2.1 PURPOSE AND POLICY

The purpose of this section is to provide for the maximum public benefit from the use of the Authority's facilities. This shall be accomplished by regulation of sewer use and wastewater discharges, by providing equitable distribution of the Authority's costs, and

by providing procedures that will allow the Authority to comply with requirements placed upon the Authority by other regulatory agencies. The revenues to be derived from the application of this Ordinance shall be used to defray all costs of providing regional sewerage service, including, but not limited to, administration, operation, monitoring, maintenance, financing, capital construction, replacement and recovery, and provisions for necessary reserves. If any discrepancy between this Ordinance and the Rules and Regulations of a Member Agency exists, the more restrictive ordinance shall govern. This Regulation shall be interpreted in accordance with the definitions set forth in Section 2. The provisions of this section shall apply to the direct or indirect discharge of all non-residential liquid wastes carried to facilities of the Authority.

To comply with Federal and State of California policies and to permit the Authority to meet applicable standards of treatment plant effluent quality, provisions are made in this document for the regulation of wastewater discharges. This Regulation establishes quantity and quality limitations on all wastewater discharges which may adversely affect the Authority's sewerage systems, processes, or effluent quality. It is the intent of these limitations to improve the quality of wastewater being received for treatment; an implication of this intent is the Authority's policy of discouraging an increase in the quantity (mass emission) of waste constituents being discharged. This document also provides for regulation of the degree of waste pretreatment required, the

issuance of permits for wastewater discharge connections, and other miscellaneous permits, and the establishment of penalties for violation of the Regulations.

8.3 WASTEWATER DISCHARGE REGULATIONS

8.3.1 PROHIBITIONS AND LIMITATIONS ON WASTEWATER DISCHARGES

No person shall discharge or deposit or cause or allow to be discharged or deposited into the wastewater treatment system any wastewater which contains the following:

(1) Oils and Grease

Wax, grease, or oil concentration of mineral origin of more than 100 mg/l whether emulsified or not, or containing substances which may solidify or become viscous at temperatures between 32° and 150°F (0° and 65°C) at the point of discharge into the system.

(2) Explosive Mixtures

Liquids, solids, or gases which by reason of their nature of quantity are, or may be, sufficient either alone or by interaction with other substances to cause fire or explosion or be injurious in any other way to the sewerage facilities or to the operation of the system. At no time shall two successive readings on an explosion hazard meter, at the point of discharge into the sewer system, be more than five percent (5%) nor any single reading over ten percent (10%) of the Lower Explosive Limit (LEL) of the meter. Prohibited

materials include, but are not limited to, gasoline, kerosene, naphtha, benzene, toluene, zylene, ethers, alcohols, ketones, aldehydes, peroxides, chlorates, perchlorates, bromates, carbides, hydrides and sulfides.

(3) Noxious Material

Noxious or malodorous solids, liquids or gases, which, either singly or by interaction with other wastes, are capable of creating a public nuisance or hazard to life.

(4) Improperly Shredded Garbage

Garbage that has not been ground or comminuted to such a degree that all particles will be carried freely in suspension under flow conditions normally prevailing in the public sewers, with no particle greater than one-half (½) inch in any dimension.

(5) Radioactive Wastes

Radioactive wastes or isotopes of such half-life or concentration that they do not comply with regulations or orders issued by the appropriate authority having control over their use and which will or may cause damage or hazards to the sewerage facilities or personnel operating the system.

(6) Solid or Viscous Wastes

Solid or viscous wastes which will or may cause obstruction to the flow in a sewer, or otherwise interfere with the proper operation of the wastewater treatment system. Prohibited materials include, but are not limited to grease, uncomminuted

garbage, animal guts or tissues, paunch manure, bones, hair, hides or fleshings, entrails, whole blood, feathers, ashes, cinders, sand, spent lime, stone or marble dust, metal, glass, straw, wood or metal shavings, grass clippings, rags, spent grains, spent hops, waste paper, wood, plastic, tar, asphalt residues, residues from refining or processing of fuel or lubricating oil, and similar substance.

(7) Excessive Discharge Rate

Wastewaters at a flow rate or containing such concentrations or quantities of pollutants that exceed for any time period longer than fifteen (15) minutes more than five (5) times the average twenty-four (24) hour concentration; quantities or flow during normal operation and that would cause a treatment process upset and subsequent loss of treatment efficiency. An excessive discharge from a Member Agency is defined as a total collection system peak discharge into Authority interceptors that exceeds the plant design ratio between average dry weather flow and peak wet weather flow. The initial 4.8 MGD plant has a 2.25 ratio or a maximum short term influent capability of 10.5 MGD.

(8) Toxic Substances

Any toxic substances in amounts exceeding standards promulgated by the Administrator of the United States Environmental Protection Agency pursuant to Section 307(a) of the Act, and chemical elements or compounds, phenols or other taste or odor-producing substances, or any other substances which are not susceptible to treatment or which may interfere

with the biological processes or efficiency of the treatment system, or that will pass through the system.

(9) Discolored Material

Wastes with objectionable color not removable by conventional secondary treatment processes.

(10) Septic Tanks and Chemical Toliets

Discharges from or through any on site wastewater treatement facilities, active or inactive are prohibited. Septic holdings are not permitted into the Authority sewerage system except by permit issued by the Authority.

(11) Acid/Base

pH lower than 5.5 or higher than 9.0.

8.3.2 STORM WATER

Storm water collection systems shall not be contributory to the Authority sewerage system. Member Agencies shall exclude storm water flows from entering into the sanitary sewer system.

8.3.3 SELF-REGENERATIVE WATER SOFTENER

Discharges from the regenerative process of on site water softening units is not permitted to be discharged into the sanitary sewer system.

8.3.4 UNPOLLUTED WATER

Unpolluted water, such as single-pass cooling water, roof drainage or parking lot runoff shall not be discharged through direct or indirect connection to an Authority interceptor.

8.3.5 SEPTIC TANK, HOLDING TANK AND CESSPOOL WASTES

Discharges of septic tank, holding tank, or cesspool wastes into the Authority's sewers or directly into the treatment plant facilities shall possess a current permit issued by the Authority and will be restricted to the times and points of discharge defined by that permit. Violations of permit restrictions may, as determined by the Authority, result in cancellation of the discharge permit and/or fines levied against the discharger.

8.3.6 TEMPERATURE

No person shall discharge wastewater with a temperature higher than 140°F (60°C).

8.3.7 POINT OF DISCHARGE

No person, excluding Authority personnel involved in maintenance functions of sewer facilities, shall discharge any wastewater directly into a manhole or other opening in a sewer other than through an approved Member Agency building sewer, without written approval from the Authority. Rules, regulations, charges and fees shall be established by Authority resolution. If during the performance of maintenance duties, Authority personnel are required to add water to the interceptor for any reason, said water flow shall be deducted from the Member Agency flow.

8.3.8 WASTEWATER STRENGTH LIMITATIONS

No person shall discharge wastewater containing substances in excess of the quantities listed in Table I entitled "Constituent Limits," or other materials, including, but not limited to, ammonia, biochemical oxygen demand, chemical oxygen demand, total

organic carbon, suspended solids, oil or grease of animal or vegetable origin, total dissolved solids, and phenolic compounds in quantities that may cause or are found to cause problems in the sewage facilities. No person shall discharge the following organic compounds: DDT (both isomers), DDE, DDD, Aldrin, Benzene Hexachloride (alpha, beta and gamma isomers), Chlordane, Endrin, Haptachlor, Dieldrin, and PCB's (polychlorinated biphenylis: Aroclors 1221, 1228, 1232, 1242, 1254, 1260, and 1262).

8.3.9 SPECIAL AGREEMENTS

Nothing in this section shall be construed as preventing any special agreement or arrangement between the Authority and a Member Agency of the wastewater treatement system whereby wastewater of unusual strength or character is accepted into the system and specially treated subject to any payments or user charges as may be applicable.

8.4.1 SEWERAGE DISCHARGE PERMITS

8.4.1.1 Mandatory Permits

All non-residential and critical dischargers proposing to connect to or discharge into the regional sewer system through a local collector system shall first obtain a Sewage Discharge Permit issued by the Member Agency involved. All non-residential and critical dischargers connected to or discharging into a local collector sewer system on the effective date such system is connected to the regional system must obtain a Sewage Discharge Permit within one hundred eighty days (180) of such date.

The wastewater discharge permit shall be in one of three forms and is dependent upon the volume and characteristics of wastewater to be discharged. The three wastewater discharge permits are:

(1) Class I Permit;

(2) Class II Permit;

(3) Critical Discharge Permit.

(GAFB will be expected to comply wih this Section of this Ordinance, but will not be required to issue or obtain permits as called for herein.)

8.4.1.2 Class I Wastewater Discharge Permit

All Class I dischargers proposing to discharge into a public sewer must obtain a wastewater discharge permit before discharging into a public sewer. All existing Class I dischargers connecting to or discharging into a local collector public sewer shall obtain a wastewater discharge permit, issued by the Member Agency within 180 days of the date such system is connected to the regional system.

8.4.1.3 Class II Permit

A Class II permit shall be required for dischargers who discharge more than 10,000 gallons per day (or 3 million gallons per year) but less than 25,000 gallons per day (or 6 million gallons per year); and are not required to obtain a Class I permit.

8.4.1.4 Critical Discharge Permit

A Critical Discharge Permit shall be required of any discharger whose classification is identified in the Standard Industrial Classifications Manual in any of Divisions A, B, D, E, and I, or who has a dishcarge flow of 25,000 gallons or more per average work

day, whose discharge contains toxic pollutants, or whose di arge may have significant impact, either singly or in combination with other contributing dischargers on the treatment or collection system.

8.4.2 MONITORING FOR MIT COMPLIANCE

Any connected ce, for which the Authority or Member Agency has determined it to be necessary will be required to install and maintain a control manhole or sampling chamber on each line of discharge and to install equipment to measure and sample the wastewater, at the owner's expense. Permanent, reliable monitoring equipment shall be installed for all sampling chambers; temporary or portable equipment shall be installed for all control manholes. Flow measurement shall be done as prescribed by the Authority or Member Agency to insure representative quantities for the entire reporting period. Analyses of the collected samples may be made by the Authority, and each affected Member Agency will be backcharged for the costs incurred therefor.

8.4.3 PERMIT APPLICATION

Dischargers seeking a Sewage Discharge Permit shall complete and file with the Member Agency and/or the Authority an application in the form prescribed by the Member Agency and/or the Authority accompanied by an application fee. The applicant will be required to submit, in units and terms appropriate for evaluation, the following information:

(1) Name, address, and Standard Industrial Classification (SIC) number of applicant and plant;

(2) Volume of sewage to be discharged;

(3) Sewage constituents and characteristics as determined by a laboratory approved by the Member Agency and/or the Authority;

(4) Time and duration of discharge;

(5) Average and thirty minute peak sewage flow rates, including daily, monthly and seasonal variations if any;

(6) Site plans, floor plans, mechanical and plumbing plans and details to show all sewer and appurtenances by size, location and elevation;

(7) Description of activities, facilities and plant process on the premises including all materials, process and types of materials which are or could be discharged;

(8) Each product produced by type, amount, and rate of production;

(9) Number and type of employees, and hours of work;

(10) Any other information as may be deemed by the Member Agency and/or the Authority to be necessary to evaluate the data furnished by the discharger and may require additional information. After evaluation and acceptance of the data furnished, the Member Agency and/or the Authority may issue a Sewage Discharge Permit, subject to terms and conditions provided herein.

8.4.4 PERMIT CONDITIONS

Sewage discharge Permits shall be expressly subject to all provisions of this Regulation and all other applicable regulations. Permits shall contain conditions as deemed appropriate by the Member Agency and/or the Authority to insure compliance with this article.

8.4.5 DURATION OF PERMITS

Permits shall be issued for a specified time period, not to exceed three years. The terms and conditions of the permit may be subject to modifications and changed by the Member Agency and/or the Authority during the life of the permit as limitations or requirements are modified and changed. The discharger shall be informed of any proposed changes in his permit at least fifteen (15) days prior to the effective date of change. Any changes or new conditions in the permit shall include a reasonable time schedule

for compliance.

8.4.6 TRANSFER OF A PERMIT

Sewage Discharge Permits are issued to a specific location for a specific operation. A Sewage Discharge Permit shall <u>not</u> be assigned or transferred to a different premises, or a new or changed operation.

8.4.7 PERMIT REVOCATION

8.4.7.1 <u>Procedure</u>

When the Member Agency and/or the Authority has reason to believe that any one of the conditions enumerated in Section 7.3 exists, it shall give written notice thereof to the discharger. Said notice shall set forth the time and place where the charges shall be heard by the Member Agency and/or the Authority. The hearing date shall not be less than fifteen (15) days from the mailing of such notice by certified mail to the discharger at the address shown on the permit. At the hearing the permittee shall have an opportunity to

refute the allegations set forth in the notice. If after the hearing, the Member Agency and/or the Authority finds a violation or finds that any one of the conditions heretofore enumerated in Section 7.3 exists, it shall have the power to revoke the permit or to impose such other conditions as may be appropriate.

8.4.7.2 Violations

Any of the following may constitute grounds for permit revocation:

(1) Failure of a discharger to factually report the wastewater constituents and characteristics of his discharge.

(2) Failure of the discharger to report significant changes in operations or wastewater consitituents and characteristics.

(3) Refusal of reasonable access to the discharger's premises for the purpose of inspection or monitoring.

(4) Violation of permit requirements and regulation conditions.

(5) Failure to pay fees and charges for use established pursuant to this regulation.

8.4.8 MONITORING FACILITIES

The Member Agency and/or the Authority may require the discharger to construct at his own expense, monitoring facilities to allow inspection, sampling, and flow measurement of the sewer, of internal drainage systems, and may also require sampling or metering equipment to be provided, installed, and operated at the discharger's expense. The monitoring facility should normally be situated on the discharger's premises, but the Member Agency and/or the Authority may, when such a location would be impractical or cause undue hardship on the dishcarger, allow the facility to be

constructed in the public right-of-way and located so that it will not be obstructed by landscaping or parked vehicles. If the monitoring facility is inside the discharger's fence, there shall be accommodations to allow access for Authority or Member Agency personnel, such as a gate secured with a lock, with key provided to Member Agency and/or Authority. There shall be ample room in or near such sampling manhole to allow accurate sampling and compositing of samples for analysis. The manhole, sampling, and measurement equipment shall be maintained at all times in a safe and proper operating condition at the expens of the discharger. Whether constructed on public or private property, the sampling and monitoring facilities shall be provided in accordance with the J.P.A. requirements and all applicable construction standards and specifications. Construction shall be completed within ninety days following written notification by the Member Agency and/or the Authority unless a time extension is otherwise granted by the Member Agency and/or the Authority.

8.4.9 INSPECTION AND SAMPLING

The Member Agency and/or the Authority may inspect the wastewater generating and disposal facilities of any discharger to ascertain whether the intent of these Regulations is being met and the discharger is complying with all requirements. Persons or occupants of premises where wastewater is created or discharged shall allow the Member Agency and/or the Authority or its representatives ready access during the normal working day to all parts of the wastewater generating and disposal facilities for the purposes of inspection and sampling. The Member Agency and/or the

Authority shall have the right to set up on the discharger's property such devices as are necessary to conduct sampling or metering operations. Where a user has security measures in force, the discharger shall make necessary arrangements so that personnel from the Member Agency and/or the Authority will be permitted to enter without delay for the purpose of performing their specific responsibilities.

8.4.10 PRETREATMENT

Dischargers shall make sewage acceptable under such limitations as may be established herein before discharging to the sewer system. Any facilities required to pretreat sewage to a level acceptable to the Member Agency and/or the Authority shall be provided and maintained at the discharger's expense. Detailed plans showing the pretreatment facilities and operating procedures shall be submitted to the Member Agency and the Authority for review, and shall be reviewed before construction of the facility. The review of such plans and operating procedures will in no way relieve the discharger from the responsibility of modifying the facility as necessary to produce an effluent acceptable to the Member Agency and/or the Authority under provisions of this article.

8.4.11 PROTECTION FROM ACCIDENTAL DISCHARGE

~~Each~~ discharger shall provide protection from accidental discharge of prohibited materials or other wastes regulated by this article. Such facilities shall be provided and maintained at the discharger's expense. Detailed plans showing facilities and operating procedures to provide this protection shall be submitted

then that discharger may be responsible for any costs or expenses, including assessments by other agencies or the court, incurred by the Member Agency and/or the Authority.

8.4.13 CONFIDENTIAL INFORMATION

All information and data on a discharger obtained from reports, questionnaires, permit applications, permits, and monitoring programs and from inspections shall be available to the public or other governmental agency without restriction unless the discharger specifically requests and is able to demonstrate to the satisfaction of the Member Agency and/or the Authority that the release of such information would divulge information, processes or methods which would be detrimental to the discharger's competitive position. When requested by the person furnishing a report, the portions of a report which might disclose trade secrets or secret processes shall not be made available for inspection by the public except by court order but may be made available to governmental agencies for use in making studies; provided however, that such portions of a report shall be available for use by the Member Agency, the Authority, the state or state or any public agency in judicial review or enforcement proceedings involving the person furnishing the report. Sewage constituents and characteristics will not be recognized as confidential information. Information accepted by the Member Agency and/or the Authority as confidential, shall not be transmitted to any governmental agency by the Member Agency and/or the Authority until and unless prior and adequate notification is given to the discharger, except under court order.

8.4.14 DISCHARGE REPORTS

The Member Agency and/or the Authority may require that any person discharging or proposing to discharge sewage into the sewer system file quarterly discharge reports. The discharge report shall include such information as is specified by the Member Agency and/or the Authority which may include the nature of process, volume, rates of flow, mass emission rate, production quantities, hours of operation, number and classification of employees, or other information which relates to the generation of waste including sewage constituents and characteristics in the sewage discharge. The Member Agency and/or the Authority may also require inclusion of the chemical constituents and quantity of liquid or gaseous materials stored on the site even though they may not normally be discharged.

8.5 CHARGE FOR USE

8.5.1 GENERAL

The purpose of a charge for use is to insure that each recipient of sewage service from the Authority pays its reasonably proportionate share of all the costs of providing that sewerage service. Charges for use are used for recovering the cost of conveying, treating and disposing of sewage in Authority facilities and are exclusive of any fees levied by local sewering agencies. The charge for use shall be based on the total maintenance, operation, capital expenditures and reserve requirements for providing regional wastewater collection, treatment and disposal and the related administration of the regional system.

8.5.2 DETERMINATION OF WASTEWATER FLOW

There are three methods allowed for determining the volume of wastewater discharged into the sewer: direct measurement, metered water supply, and adjusted metered water supply. Those dischargers reaching 10% or more of the design capacity of the sewer, or an average of 25,000 gallons or more per day, must provide a continuous, automatic total flow measurement system incorporating flow indication, totalization, and recording of the wastewater flow (direct measurement system). Those users having less capacity and not having a continuous wastewater flow measurement system must use metered water supply. Irrigation systems shall have a separate meter or be submetered for this purpose or adjusted metered waste supply measurements to determine flow may be requested, where calculations of irrigation can reasonably be estimated.

8.5.2.1 Direct Measurement

Reports the volume of wastewater determined by a full time flow meter, measuring the wastewater leaving the property.

8.5.2.2 Metered Water Supply

Reports the amount of wastewater discharged when the flow volume is a measurement of the total water entering the company plant. This volume can be taken from water bills or a flow measuring device which measures the intake of water from either public or private water sources.

8.5.2.3 Adjusted Metered Water Supply

Reports the amount of wastewater discharged when deductions of water consumed in plant operations are subtracted from the total

volume of metered water entering the plant. This results in a calculated rather than a measured flow volume of wastewater leaving the plant. The adjusted meter water supply, when approved, is determined by deducting measured quantities of water consumed in plant operations from the metered water supply.

8.5.3 DETERMINATION OF BIOLOGICAL OXYGEN DEMAND (BOD), SUSPENDED SOLIDS (SS)

(1) The BOD and SS concentrations required for surcharge determination will be calculated from the average of the last six samples. Each sample shall be a 24 hour composite collected proportional to flow. Each 24 hour composite sample must have individual samples taken at least once per hour during all 24 hours or any lesser number of hours that wastewater is flowing into the sewer.

(2) Samples shall be collected not less than once a month.

(3) The sample collected shall be in accordance with proper sampling and handling techniques outlined in the latest edition of Standard Methods or the Methods for Chemical Analysis of Water and Wastes published by the EPA. Samples collected shall be delivered to a California State Certified Laboratory for analysis within the holding period of the sample. The Authority may require samples to be split for concurrent analysis.

(4) The weight discharge of BOD and SS can be determined using the concentration and the flow for the appropriate period according to the following formula.

Flow volume discharged in MGD	X	BOD or SS concentration in milligrams per liter (mg/l)	X 8.34 =	Pounds of BOD or SS to 2 decimal place

8.5.4 CLASS I CHARGE FOR USE

The Class I charge for use shall be computed by the following formula:

$$\text{Charge for use} = (V_o V) + (B_o B) + (S_o S)$$

Where V = total volume of flow, in MGD

B = total discharge of biochemical oxygen demand, in pounds

S = total discharge of suspended solids, in pounds

V_o, B_o, S_o = unit charge rates adopted annually by the Member Agency and/or the Authority based upon the funding requirements of providing sewerage service, in dollars per unit

Other measurements of the organic content of the wastewater of a discharger, such as COD or TOC may be used instead of BOD when BOD is not applicable. However, the discharger must establish for the Member Agency and/or the Authority a relationship between the BOD of his wastewater and the other measured parameter. This relationship shall be used by the Member Agency and/or the Authority in determining the charge for use. When wastewater from sanitary facilities is discharged separately from the other

wastewaters of a discharger, the charge for use for discharging the sanitary wastewater may be determined by using the following.

(1) 10,000 gallons per employee per year,

(2) 21 pounds of suspended solids per employee per year, (See 250 mg/l SS)

(3) 17 pounds of biochemical oxygen demand (BOD) per employee per year. (See 200 mg/l BOD)

(The number of employees of a discharger will be considered as the average number of people employed full time on a daily basis. This may be determined by averaging the number of people employed at the beginning and ending of each quarter, or other period that reflects normal employment fluctuations.)

8.5.5 CLASS II CHARGE FOR USE

The Class II charge for use shall be determined as follows: Appropriate BOD and Suspended Solid concentrations will be determined for the particular discharger. A composite rate representing the mass of BOD plus the mass of Suspended Solids plus the volume of wastewater will be determined. This composite rate times the volume of wastewater in MGD will be the charge for use.

8.5.6 MASS EMISSION RATES - RATE DETERMINATION

Maximum mass emission rates for incompatible and/or compatible pollutants that are present or anticipated in the discharger's wastewater discharge shall be set for each discharger and made an

applicable part of each discharger's permit. These rates shall be based on the discharger's average daily wastewater discharge for the past three years. When discharge data for three years is not available, data for a year, or that which is mutually acceptable to the discharger and the Member Agency and/or the Authority shall be used.

8.5.7 NON-COMPLIANCE DETERMINATION

Non-compliance with permit requirements may be determined by an analysis of a grab sample of the effluent of a discharger for any constituent or condition specified in the discharger's permit. If the effluent of a discharger is found by the analysis of the grab sample to be in excess of the concentrations or conditions specified in Table I, then a Sampling and Evaluation Program may be initiated by the Member Agency and/or the Authority. If the Sampling and Evaluation Program reveals non-compliance by the discharger with the mass emission rates or conditions specified in the discharger's permit, the discharger shall pay the fees, as specified in Tables II and III to the Authority. The fees specified shall become retroactive to the date the Sampling and evaluation Program started. The fees for non-compliance, based on the mass emission rate determined in the Sampling and Evaluation Program, shall continue to accumulate on a daily basis until the discharger can show corrective action has been taken or compliance achieved, but corrective action shall not exceed ten normal working days. If the period of non-compliance continues for more than ten consecutive normal working days, the Member Agency and/or the

Authority may proceed with one the following:

(1) Amend the existing permit. This may be done only when the discharger has shown good faith in trying to comply and requires additional time for construction and/or acquiring equipment. The permit may be amended for a period not to exceed 180 days; however, this period may be extended upon determination by the Member Agency and/or the Authority for good cause.

(2) Proceed with enforcement action as outlined in Section 13.7. The payment of non-compliance fees will not relieve the discharger of the penalties as specified in Section 13.12.

SECTION 10

SERVICE CHARGES

10.1 ESTABLISHMENT OF RATES

Rates to be charged and collected and terms, provisions, and conditions to be effective respecting such rates for regional sewer service supplied by the Authority to Member Agencies within the Authority Service Area shall be as fixed and established by the Commission from time to time and shall become an attachment of these Rules and Regulations. This provision is in addition to and not by way of derogation of any other remedies or procedures available to the Authority pursuant to any law or regulation or by any of the provisions of these Rules and Regulations.

10.2 CHANGE OF SERVICE CHARGE

The Commission reserves the right to change the schedule of regional sewer service charges and other charges and fees from time to time as necessary for the proper operation, maintenance, repair, replacement and expansion of the regional system.

10.3 SERVICE CHARGE BILLING

Regional sewer service charges to Member Agencies will be rendered as part of the Authority Service Bill at monthly intervals.

10.4 METERING

For the purpose of computing charges, a metering station will be constructed at all connections to the Authority's Interceptor Sewer. Such metering stations will accurately record both flow rate and cumulative totals prior to entry of contributing flows into the interceptor. These metering stations shall be calibrated and maintained by Authority personnel only. Billings will be sent to each connected entity on a monthly basis. Contested accuracy of flow recordings will require the Authority to verify metering accuracy. Such test shall be performed by a certified, independent testing company. Approved metering devices are Parshall Flume type and Repetition counter types installed to the highest industry standards for accuracy and maintenance. If, for any reason, the metering station is out of service, the Authority will estimate contributions based on the best available information including previous flows and existing conditions.

SECTION 11

CONNECTION FEES

11.1 INTRODUCTION

The regional wastewater treatment and disposal facilities will provide adequate capacity for a limited period of time. Future capacity requirements must be considered to enable the Authority to fully meet its community service objectives. It is the Authority's intent herein to provide the capital required to pay for construction in advance to assure all the Member Entities that services will not be interrupted. Capital will be accumulated before it is required (pay-as-you-go) by levying connection fees. Connection fees have traditionally been pay-as-you-go method for financing plant expansion in a growth situation. This follows the logic that, upon connection, a new discharger pays for his capacity just as the existing dischargers had paid to develop the original capacity. The connection fees are accumulated in a fund for use when the sewerage system requires expansion.

George Air Force Base will pay their fair capital expense for depreciation and replacement including expenses associated with increasing their proposed flow, however, GAFB is not committed to contribute monies for the expansion of member agency area growth.

11.2 CONNECTION FEES

A. Connection fees will not be applied to properties developed

prior to July 1, 1932, which are conncected to existing local collection systems.

B. Properties developed prior to July 1, 1982, but unconnected to existing local collection systems will not be charged regional (VVWRA) connection fees for the first five years after the completion of the interceptor to the contracting community. Thereafter, applicable VVWRA connection fees will apply to such properties.

C. Properties developed after June 30, 1982 will pay a connection fee applicable at the time of connection. Likewise, any additions or improvements to properties developed prior to July 1, 1982, which are connected and generate additional sewage, will pay a connection fee at the time applicable permits are issued.

D. "Properties developed" as defined in Paragraph 5 of the Policy Resolution shall be deemed to include all properties designated to be sewered within the boundaries of the Authority for which a building permit for residential, commercial, or industrial structures has been issued and all applicable fees therefor have been paid on or ~~prior~~ to June ~~30~~, 1982.

E. Connection fees are shown on the attached Table V. The Authority may from time to time revise these fees as future construction cost projections increase or decrease. Fees apply

to all development and are based on equivalent dwelling units (EDU). An EDU is defined as 19 fixture units as shown in the Equivalent Fixture Units table in the latest edition of the Uniform Plumbing Code. This equivalency assumes 245 gallons per day per residence as an average residential sewage flow for purposes of determining the basis for charging all non-single family discharges a connection fee.

11.3 DUTY OF ENFORCEMENT

The Member and J.P.A. are hereby charged with the duty of enforcing this section. The provisions of this section shall be applicable to any building, structure or property contributing to the Authority's regional sewer system, whether the same is owned, operated or controlled by a private party or by a public or quasi-public agency, corporation or association, other than the Authority, with the exception of GAFB which is governed by its own Service Agreement. The Member Agency shall, through the "Will Serve" process enforce payment of these fees. The Member Agency may, in addition thereto, add connection fees for their own purposes. Further, administrative and lateral charges may also be applicable.

SECTION 12

SEVERABILITY

If any section, subsection, clause, or phrase of these Rules and Regulations is for any reason held to be invalid or unconstitutional, such decisions shall not affect the remaining portions of these Rules and Regulations. The Authority declares that it would have passed said Rules and Regulations by sections, subsection, sentence, clause, or phrase thereof.

SECTION 13

ENFORCEMENT AND PENALTIES

13.1 GENERAL

Any person found to be violating any provision of these Rules and Regulations or the terms and conditions of the applicant's, owner's, or customer's service agreement, permit or any and all applicable Federal, State, or local statutes, regulations, ordinances, or other requirements shall be served by the Authority or Member Agency with written notice stating the nature of the violation and providing a reasonable time limit for the satisfactory correction thereof. The offender shall, within the period of time stated in such notice, permanently cease all violations. This provision is in addition to and not by way of derogation of any other remedies or procedures available to the Authority or Member Agency by law, regulations, or pursuant to any of the provisions of these Rules and Regulations. Failure to permanently cease all violations within the time stated may result in revocation of the permit by the Authority or Member Agency and termination of sewer service in the following manner:

13.2 ENFORCEMENT PROCEDURES

13.2.1 Notification of Violation

Whenever the Authority or Member Agency finds that any person has violated or is violating this ordinance, or any prohibition, limitation or requirement contained herein or otherwise applicable,

the Member Agency and/or the Authority shall serve upon such person a written notice stating the nature of the violation and providing a reasonable time, not to exceed ten consecutive normal working days, for the satisfactory correction thereof.

13.2.2 Show Cause Hearing

If the violation is not corrected by timely compliance, the Member Agency and/or the Authority may order any person who causes or allows an unauthorized discharge to show cause before the Board of Commissioners why service should not be terminated. A notice shall be served on the offending party, specifying the time and place of a hearing to be ~~held by~~ the Board of Commissioners regarding the violation, and directing the offending party to show cause before the Commissioners why an order should not be made directing the ~~termination of service or other disciplinary action.~~ The notice of the hearing shall be served personally or by certified mail.

13.2.3 In addition to such other penalties as may be prescribed for a violation of this article, whenever the Authority or Member Agency finds that a discharge of sewage has been taking place in violation of any prohibitions or limitations prescribed herein or any effluent limitations or pretreatment standards promulgated in accordance herewith, it may require the discharger to submit for its approval a detailed time schedule of specific actions which the discharger shall take in order to prevent or correct such violation. Any failure to comply with such an approved time schedule shall likewise be deemed a violation of this article.

13.3 INTERIM REVOCATION

In cases where the serious nature of the violations described above require immediate action, the Commission may require Member Agencies to immediately revoke the permit of the violator on an interim basis and may cease sewer service, subject to a timely decision on permanent revocation of permit pursuant to a public hearing as provided herein. In cases of sewer service termination, there shall be no discharge of any type by the violator into the Member Agencies' sewer facilities.

13.4 PERMANENT REVOCATION

Permanent revocation of a permit shall occur only subsequent to a public hearing held in the manner hereinafter provided. The violator shall be given written notice at least ten (10) consecutive calendar days prior to a hearing on the possible permanent revocation of any permit. The notice shall specify the grounds of the proposed revocation of any such permit in reasonable detail. It may but need not describe suggestive corrective action acceptable to the member Agency and/or the Authority. Notice may be delivered personally to the violator or it may be given by depositing such in the United State Mail with postage prepaid, addressed to the violator either at the billing address or the address for the violator as reflected on the last equalized assessment roll of the County of San Bernardino as defined in the Revenue and Taxation Code of the State of California. Any such action to permanently revoke the permit shall be effective ten (10)

consecutive calendar days after notice of the Board's decision and shall be either personally delivered to the violator or placed in the United States Mail, postage prepaid, addressed to the violator in the manner hereinabove specified. In the alternative to such action, the Authority may establish a surcharge or other terms and conditions on the continuation of sewer service by the Member Agency and the Authority until such time as the violator has taken action to comply with all of the hereinabove described requirements for obtaining services from the Authority in its reasonable discretion. Any request to re-establish service subsequent to the revocation of a permit and the termination of sewer service shall be in the manner prescribed for initially obtaining service from the Member Agency and the Authority which may include the collection of a security deposit. However, in addition, the Authority may, in its discretion, require that an agreement and financial security conditioned upon compliance with the Authority's Rules and Regulations be provided in an amount, manner, and for a period of time as determined by the Commission. The foregoing provisions of these Rules and Regulations are a requirement of any permit, and any application for service and permit therefore shall be subject to such provisions. The Commission, if it deems such to be in the best interest of the Authority, may on an interim basis or otherwise waive or modify any of the foregoing.

13.5 CIVIL ACTION

13.5.1 Civil Penalties

Any person who violates any provision of this regulation or permit condition or who violates any cease and desist order, prohibition or effluent limitation, is guilty of a misdemeanor, which upon conviction, is punishable by a fine of not less than twenty-five dollars ($25) nor more than one hundred dollars ($100).

13.5.2 Other Penalties

Any violation of these rules and regulations which is also a violation of the Federal and State laws and regulations is subject to Federal and State enforcement penalties and proceedings.

13.5.3 Damage of Facilities or Interruption of Normal Operations

When a discharge of wastes cause an obstruction, damage, or any other impairment to the Authority's operation or facilities, the Authority may after notice and hearing, assess a charge against the Member Agency or the offending discharger for the work required to clean or repair the facility or costs incurred to resume normal operations. A service fee of 25 percent of the Authority's costs may be added to these charges and shall be payable within thirty (30) days of invoicing by the Authority.

13.5.4 Falsifying Information

Any person who knowingly makes or files any false statement, representation, record, report, plan or other document with the Authority and/or Member Agency, or who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or measuring method required under this regulation, shall be in violation of this ordinance and shall be subject to the penalties provided for herein and otherwise provided by law.

13.6 APPEALS

Any discharger, permit applicant, or permit holder affected by any decision, action, or determination, including cease and desist orders, made by the Member Agency and/or the Authority interpreting or implementing the provisions of this regulation or in any permit issued or denied hereunder may file with the Authority a written request for reconsideration in writing within 15 days thereafter. If the ruling on the request for reconsideration is unsatisfactory to the applicant, the person requesting reconsideration may, within 10 days after notification of the action thereon, file a written appeal to the Commission of the Authority. A fee of $100 shall accompany the appeal, provided, however, that no fee will be charged if the appellant submits a declaration of inability to pay. This fee may be refunded if the appeal is sustained in favor of the appellant. The written appeal shall be heard by the Commission within 45 days from the date of filing. The Commission shall make a final ruling on the appeal within 60 days from the date of filing.

13.7 PAYMENT OF CHARGES, DELINQUENCIES, PENALTIES

Except as otherwise provided, all charges and penalties made pursuant to the provisions of this regulation are due and payable upon receipt of notice thereof. All such charges shall become delinquent 30 days after mailing notice thereof to the mailing address of the discharger subject to such charges. Any charge that becomes delinquent may have added to it a penalty charge equal to the maximum interest permitted by law.

13.8 PENALTY COSTS

Any person or Member Agency who is found to have violated an order of the Authority or who willfully or negligently failed to comply with any provision of this ordinance, and the orders, rules and regulations issued hereunder, shall be subject to fine of not less than twenty-five ($25) nor more than one hundred ($100) dollars for each offense. Each day on which a violation shall occur or continue shall be deemed as separate and distinct offense. In addition to the penalties provided herein, the Authority may recover reasonable attorneys' fees, court costs, court reporters' fees and other expenses of litigation by appropriate suits at law against the person found to have violated this ordinance or the orders, rules and regulations issued hereunder.

13.9 COLLECTION

Upon motion by the Board of Commissioners of the Authority, any charge and all penalties thereon shall be collected by lawsuit in

the name of the Authority. Any such action for collection may include an application for an injunction to prevent repeated and recurring violations of this ordinance.

13.10 WAIVER OR ORDINANCE PROVISIONS

In the event of any declared local, state, or federal emergency, the provisions of this ordinance may be waived by resolution of the Board of Commissioners.

13.11 SAVINGS CLAUSE

If any provision, paragraph, work, section or article of this ordinance is invalidated by any court of competent jurisdiction, the remaining provisions, paragraphs, words, sections, and articles shall not be affected and shall continue in full force and effect.

13.12 CONFLICT

All ordinances and parts of ordinances inconsistent or conflicting with any part of this ordinance are hereby repealed to the extend of such inconsistency or conflict.

V V W R A

USE ORDINANCE

TABLE I

CONSTITUENT LIMITS

CONSTITUENT	DISCHARGE LIMITS (mg/l)
Arsenic	1.0
Cadmium	1.0
Hex Chromium	1.0
Total Chromium	1.5
Copper	2.0
Lead	2.0
Mercury	0.03
Nickel	3.0
Silver	2.0
Zinc	3.0
Selenium	0.5
Cyanide (Total)	1.0
Cyanide (Free)	1.0
Boron	1.0
Flouride-	5.0
Nitrogen (Total)	54.0
Chlorinated Hydrocarbons	Essentially None
Phenolic Compounds	1.5
Sulfide (Dissolved)	0.5
Oil and Grease	100
Suspended Solids	*500
Chloride	100
Sulfate	100
Iron	10.1
Sodium	125
MBAS	2.0
TFR	650

* Shall not include hydroxides of heavy metals and toxicants

TABLE II

FEES FOR NON-COMPATIBLE CONSTITUENTS

CONSTITUENT	DOLLARS PER POUND PER DAY IN EXCESS OF LIMIT
Arsenic	$100.00
Cadmium	100.00
Chromium	100.00
Copper	30.00
Lead	40.00
Mercury	100.00
Nickel	40.00
Silver	100.00
Zinc	20.00
Cyanide (Total)	40.00
Total Identifiable Chlorinated Hydrocarbons	100.00
Phenols	150.00
Dissolved Sulfides	50.00
Oil and Grease (Animal or Vegetable Origin)	2.00
Oil and Grease (Mineral or Petroleum Origin)	12.00

TABLE III

FIXED AND VARIABLE O&M CHARGES PER JPA AGREEMENTS

TOTAL ESTIMATED FLOW (86-87) 1441.75 MG

FY 86-87 USER BUDGET $1,260,174 /YR

COST PER MG OF TREATMENT

$1,260,174 / 1441.75 MG = $874.06 /MG

GAFB COST = GAFB FLOW X COST/MG

0.78 MGD X 365.00 = 284.7 MG
284.70 MG X $ 874.06 = $248,845 /YR

MEMBER ENTITY COST = BUDGET LESS GAFB COST

$1,260,174 - $248,845 = $1,011,329 /YR

MEMBER ENTITY FIXED COST / 12 MONTHS = M.E. COST/MONTH

$ 48000.00 / 12 = $4,000 /MO

JPA PERCENTAGES OF FIXED COSTS PER MONTH

ADELANTO			0.0333	X	$4,000 =	$133 MO
AVCWD			0.2033	X	$4,000 =	$813 MO
HWD			0.2434	X	$4,000 =	$974 MO
CSA 42			0.0133	X	$4,000 =	$53 MO
CSA 64*	0.134	X	0.5067	X	$4,000 =	$272 MO
VICTORVILLE*	0.866	X	0.5067	X	$4,000 =	$1,755 MO

ME VARIABLE COST = ME COST - ME FIXED COST

$1,011,329 - $48,000 = $963,329 /YR

VARIABLE COSTS ARE CALCULATED AS FOLLOWS:

TOTAL ANTICIPATED FLOW LESS GAFB FLOW

1441.75 - 284.70 = 1157.05 ME FLOW

~~MEMBER ENTITY COSTS / MEMBER ENTITY FLOW~~

$963,329 / 1157.05 MG = $832.57 /MG

GAFB COSTS ARE BILLED AT $874.06 PER MG TREATED **

MEMBER ENTITIES ARE BILLED AT $832.57 PER MG TREATED PLUS FIXED COSTS **

* BASED ON PROJECTED FLOW RATIO FOR DISBURSEMENT OF COMBINED FIXED COSTS OF $2027

** COSTS FOR LIABILITY INSURANCE NOT INCLUDED IN ABOVE RATES

TABLE IV
UNIT O&M COST DETERMINATION

USER BUDGET FY 1986-87 $1,260,174

ESTIMATED FLOW FY 1986-87 1441.75 MG

COST PER MG TREATED:

$1,260,174 / 1441.75 MG = $874.06 /MG

UNIT O&M COST IS BASED UPON:

FLOW = 24% OF TOTAL COST

BOD = 36% OF TOTAL COST

TSS = 40% OF TOTAL COST

UNIT COST IS:

FLOW = 0.24 X $1,260,174 / 1441.75 MG = $209.77 /MG

BOD = 0.36 X $1,260,174 / 2404839 LBS = $0.189 /LB

TSS = 0.40 X $1,260,174 / 3006049 LBS = $0.168 /LB

NOTE: POUNDS OF DISCHARGE ARE DETERMINED AS FOLLOWS:

BOD: FLOW (MG) X 200 mg/l (BOD) X 8.34

TSS: FLOW (MG) X 250 mg/l (TSS) X 8.34

VICTOR VALLEY WASTEWATER RECLAMATION AUTHORITY

USE ORDINANCE

TABLE V

CONNECTION FEES

Connection fees shall be according to the Financial Policy adopted by the Authority on November 12, 1981 (Resolution No. 81-10), Paragraph 5, Articles A, B, C and D.

The initial connection fee is $1,365 per equivalent dwelling unit (EDU). On July 1st each year hereafter, this fee may increase.

The State of California defines one Equivalent Dwelling Unit (EDU) as the discharge during a 24-hour period from one single family residence. For purposes of computing connection fees for all non-single family ~~dwelling units,~~ the latest edition of the Uniform Plumbing Code is used, wherein the chapter on drainage systems assigns 21 fixture units per single family residence. The Authority has assigned 245 gallons to be the average discharge from each EDU.

METER STATION MONTHLY FLOWS

VICTOR VALLEY WASTEWATER RECLAMATION AUTHORITY

8/1/86 TO 8/31/86

DATE	VSD #2 mgd	AVMS mgd	Hesp MS mgd	CSA #64 mgd	Adlnto MS mgd	CSA #42 mgd	GAFB #2 mgd	GAFB #1 mgd	VSD #1 mgd	MetStat mgd
8/1/86	.074	.309	.138	.372	.029	.06	.139	.578	2.41	4.169
8/2/86	.074	.27	.114	.374	.029	.06	.153	.418	2.1	3.592
8/3/86	.074	.255	.104	.397	.029	.06	.241	.658	2.24	4.058
8/4/86	.072	.293	.134	.328	.028	.065	.231	.545	2.29	3.386
8/5/86	.076	.295	.149	.355	.028	.066	.208	.677	2.29	4.144
8/6/86	.086	.287	.115	.344	.028	.067	.203	.56	2.27	3.96
8/7/86	.082	.294	.121	.37	.03	.074	.235	.56	2.24	4.006
8/8/86	.085	.295	.122	.349	.041	.061	.173	.512	2.09	3.729
8/9/86	.085	.233	.144	.43	.041	.061	.2	.546	2.38	4.18
8/10/86	.085	.261	.124	.406	.041	.061	.238	.616	2.35	4.182
8/11/86	.085	.283	.136	.33	.025	.063	.21	.58	2.24	3.952
8/12/86	.077	.287	.169	.355	.036	.063	.191	.586	2.22	3.984
8/13/86	.078	.293	.173	.384	.031	.067	.211	.51	2.28	4.017
8/14/86	.077	.286	.136	.427	.041	.089	.201	.592	2.32	4.169
8/15/86	.076	.31	.143	.342	.046	.061	.18	.539	2.34	4.037
8/16/86	.076	.261	.131	.358	.046	.061	.182	.463	2.29	3.863
8/17/86	.076	.257	.118	.452	.046	.061	.199	.523	2.24	3.972
8/18/86	.082	.29	.12	.393	.056	.062	.211	.63	2.3	4.144
8/19/86	.082	.292	.119	.381	.047	.072	.211	.563	2.26	4.027
8/20/86	.082	.278	.112	.382	.06	.067	.211	.55	2.26	4.002
8/21/86	.096	.302	.135	.411	.06	.081	.205	.492	2.28	4.062
8/22/86	.087	.331	.138	.439	.053	.072	.234	.639	2.46	4.453
8/23/86	.087	.255	.109	.337	.053	.072	.166	.282	1.84	3.201
8/24/86	.087	.252	.108	.384	.053	.072	.192	.461	2.34	3.949
8/25/86	.097	.297	.153	.373	.058	.074	.211	.572	2.33	4.165
8/26/86	.094	.325	.176	.358	.041	.071	.211	.511	2.19	3.977
8/27/86	.082	.293	.199	.409	.053	.074	.269	.568	2.55	4.497
8/28/86	.09	.282	.176	.386	.047	.081	.238	.482	2.29	4.072
8/29/86	.082	.314	.161	.403	.039	.071	.246	.398	2.5	4.214
8/30/86	.082	.262	.137	.388	.039	.071	.217	.326	2.14	3.662
8/31/86	.082	.282	.119	.456	.039	.071	.253	.48	2.48	4.262
MIN	.072	.252	.104	.328	.025	.06	.153	.282	1.84	3.201
MAX	.097	.331	.199	.456	.06	.089	.269	.677	2.55	4.497
AVE	8.22E-02	.285	.136	.383	4.17E-02	6.80E-02	.210	.529	2.284	4.022

ATCH 2

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BILLED AVERAGE DAILY FLOW

	VSD-I	VSD-II	TOTAL VSD	CSA-64 (SPRING VALLEY)	GAFB-I	GAFB-II	TOTAL GAFB	CSA-42 (ORO GRANDE)	#2 AVCWD	#3 HESPERIA	ADELANTO	CUSTOMER TOTAL	PLANT TOTAL
ULY '84	2.352	0.0301	2.3821	0.2739	0.5442 est.	0.25	0.7942	0.082	0.1720	0.0717	-	3.7759	3.9306
UG. 84	2.389	0.0303	2.4193	0.2500	0.5712 est.	0.25	0.8212	0.0869	0.1441	0.0724	.0068	3.8007	3.7835
EPT. '84	2.334	0.0474	2.3814	0.2298	0.5955 est.	0.25	0.8455	0.085	0.1623	0.0638	.0336	3.8014	3.8241
CTOBER '84	2.400	0.0281	2.4281	0.234	0.544 est.	0.25	0.794	0.072	0.164	0.073	.020	3.7851	3.757
OV. '84	2.31	0.0289	2.3389	0.2478	0.573	0.25	0.823	0.058	0.172	0.0713	.008	3.719	3.752
EC 84	2.28	0.042	2.322	0.270	0.642	0.267	0.909	0.061	0.179	0.081	.037	3.859	3.776
ANUARY 1985	2.074	0.0473	2.1213	0.259	0.670	0.25	0.920	0.058	0.177	0.0867	.022	3.644	3.603
EBRUARY 1985	2.061	0.049	2.110	0.284	0.639	0.259	0.898	0.054	0.183	0.092	.010	3.631	
ARCH 1985	1.96	0.059	2.039	0.272	0.570	0.243	0.813	0.059	0.198	0.093	.016	3.490	3.615
PRIL 1985	2.136	0.051	2.187	0.256	0.509	0.227	0.736	0.063	0.205	0.082	.0104	3.5394	3.494
AY 1985	2.1827	0.05546	2.238	0.2484	0.5253	0.220	0.7473	0.0526	0.203	0.082	.0115	3.583	3.615
UNE 1985	2.1501	0.04423	2.1943	0.2653	0.517	0.2088	0.7258	0.0561	0.21008	0.0805	.0129	3.545	3.50
12 Mo.Average	2.2207	0.0427	2.2634	0.2575	0.575	0.244	0.8189	0.0656	0.1808	0.0791	.0171	3.681	
ULY 1985	2.1464	0.0485	2.1949	0.2764	0.5161	0.2062	0.7213	0.0689	0.2062	0.0872	0.0160	3.5709	3.808C
UG., 1985	2.167	0.0390	2.2060	0.2740	0.5584	0.2287	0.7871	0.0805	0.2220	0.0827	0.0170	3.6693	3.6980
EP., 1985	2.2857	0.0623	2.3480	0.2619	0.6173	0.2550	0.8723	0.0616	0.2286	0.1084	0.0222	3.9030	3.8033*
CT., 1985	2.2263	0.0456	2.2719	0.2686	0.5401	0.2659	0.8060	0.0598	0.2429	0.1208	0.0270	3.7970	3.797
OV., 1985	2.165	0.074	2.239	0.3850 ***	0.614	.267	.881	0.053	0.239	0.130	0.031	3.9580 ***	4.006
DEC., 1985	2.231	0.061	2.292	0.394	0.575	0.238	0.813	0.062	0.240	0.124	0.031	3.9560	3.9694 *
JAN., 1986	2.2771	0.0430	2.3201	0.3809	0.5276	0.2307	0.7583	0.0540	0.2400**	0.1180	0.0296	3.9009**	3.9340 *
FEB., 1986	2.3081	0.0672	2.3753	0.3634	0.5321	0.3636	0.8957	0.0510	0.2500**	0.1222	0.0326	4.0902**	4.1113 *
MAR., 1986	2.3369	0.0657	2.4026	0.3691	0.5794	0.3030	0.9004	0.0498	0.2610	0.1218	0.0322	4.1429	4.1197*
APR., 1986	2.2669	0.0713	2.3382	0.3532	0.5540	0.2255	0.7795	0.0479	0.2614	0.1282	0.0311	3.9395	3.9548*
MAY, 1986	2.1966	0.0709	2.2675	0.3538	0.5692	0.2108	0.7800	0.0482	0.2669	0.1190	0.0407	3.8761	3.9075 *
JUNE, 1986	2.1975	0.0768	2.2743	0.3384	0.5974	0.2232	0.8206	0.0535	0.2673	0.1203	0.0374	3.9118	3.9179*
JULY 1986	2.2408	0.0745	2.3153	0.3543	0.5715	0.2285	0.8000	0.0595	0.2882	0.1316	0.0338	3.9827	3.9681*

* TOTAL MONITORING STATION
*** REVISED JAN. 1986
** REVISED MAY, 1986

USAFOEHL
AQUATIC BIOASSAY INFORMATION SHEET

RATIONALE:

The use of living organisms to detect the presence of toxic materials in the environment goes back to the use of parakeets in coal mines to indicate to the miners that the air was not fit to breathe. We use aquatic organisms at USAFOEHL for the same conceptual purpose: to detect the presence of toxic materials in the environment. We use juvenile water fleas (Daphnia magna) and fathead minnows (Pimephales promelas) for two main purposes. First, we use them to test for toxicity of USAF base effluents; particularly for NPDES permit compliance. Second, these aquatic organisms serve as reliable indicators for screening suspected contaminated water samples before more expensive chemical analysis are attempted to support fish kill investigations. We also use the larvae of a mosquito (Wyeomyia smithii) as well as a species of aquatic bacteria (Photobacterium phosphoreum) for testing the toxicity of selected water samples. We do this because all too often when water samples are collected in support of a fish kill investigation they are taken a considerable time after the event. Therefore, the water submitted to us may not be representative of the situation at the time of the event and may not be toxic at all. This biological screening protocol saves us the considerable time and money required to perform a battery of tests in an attempt to isolate a nonexistent toxic component.

PROCEDURES:

We perform our aquatic toxicity tests following the procedures in : (1) Standard Methods for the Examination of Water and Wastewater (16th Edition); (2) Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms, EPA/600/4-85/013; and (3) Quality Assurance Manual for Performing Acute Toxicity Tests, FDER Biological Section, 1983.

To perform our standard 48 hour acute toxicity test we use 250 ml of sample for the Daphnia or 2000 ml for the fish. All tests are run in glass beakers. We use juvenile fish, less than 3 months old, which are originally obtained from the National Fish Hatchery in Uvalde TX. We use juvenile Daphnia, less than 24 hours old. We always run at least one duplicate of each test and two simultaneous controls, which are set up exactly the same as the test, but use our standard laboratory dilution water. (We use dechlorinated Brooks AFB tap water which comes from the Edwards underground aquifer and is of very high quality as our dilution water.) The controls are used to confirm the reliability of our test procedure. In the instances where we are required to determine the amount of a suspected toxicant that would kill half the organisms (LC50), additional dilutions of thesample are required. We routinely use 50% and 25% of the sample mixed with our laboratory water plus an undiluted 100% sample. The organisms are observed every 24 hours to determine deaths, the number of which is proportional to the level of toxicity. We use death as the end point of our tests, or in the case of the Daphnia, the cessation of all movement, even on stimulation. Our tests are run in environmental chambers at a constant 22 degrees centigrade (+/- one degree).

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USAFOEHL BIOASSAY RECORD SHEET:

The attached record sheet reports the results of our toxicity test as well as basic analytical information. Each page represents one sample with all dilution percentages used. Your "BASE SAMPLE NUMBER" and our "TEST NUMBER" are indicated on the first line as our "SPECIAL PROJECT NUMBER" and our "CONSULTATIVE LETTER (CL) OR TECHNICAL REPORT (TR) NUMBER" where relevant. Your organization and our project personnel are identified in the next section along with the sample receipt date. Our target organism is identified next with the LC50 if one was calculated and the "DURATION": of the test in "HOURS." We next have listed results of the analyses we performed on the raw sample, such as "D.O." (dissolved oxygen), "PH", "TEMPERATURE" (centigrade and fahrenheit), "ALKALINITY" (as mg/l CaCO3), "CL" (chlorine) and any relevant "OTHER DATA". We also note the time and date we actually start the test. The numbers "1" through "7" signify the number of replicates. (There will always be at least one duplicate of each sample dilution tested.) The (STARTING NUMBER' refers to the number of organisms used in each test, usually 10. The "DILUTION PERCENT" refers to the concentration of your sample used in each replicate.. Undiluted sample is identified as 100% dilution and 0% dilution represents the laboratory control samples which will be the same for each page. (If run on the same day, the two controls will serve for all samples run that day.) "SURVIVAL NUMBER" is the number of organisms still alive at that "TIME INTERVAL". "SURVIVAL PERCENT" will read 100 when no toxicity is measured. The lower the percent survival the more toxic the sample. Observations are annotated at each 24 hour mark. There may be an occasion to run a test through 96 hours depending on the circumstance, otherwise these areas will be left blank. We also report the DO, pH and any other relevant parameters at each time interval.

Please call Major Tom Doane at AUTOVON 240-3667 (Commercial 512/536-3667) if you have questions about our procedures or your results.

DEPARTMENT OF THE AIR FORCE
OEHL/ECQ
Brooks AFB
San Antonio, TX 78235

WATER LAB INSTRUCTION

18 JUNE 1985

Lab-Scale Activated Sludge Plant
Sampling and Maintenance

I. DESCRIPTION: Treatability studies are frequently conducted to determine the feasibility of using a particular process to dispose of a wastewater stream. Such a study is to be conducted on paint stripping wastewater using two activated sludge units (ASU). The lab-scale units, operating under different conditions, are required to determine values of kinetic parameters for optimization and scale-up. Consistency in feeding, sampling, and analyses is essential.

II. RESPONSIBILITIES: The NCOIC of the Water function will ensure that the activated sludge culture in each of the two units is properly maintained, and that test solutions are replenished as needed.

III. ACTIVATED SLUDGE UNIT MAINTENANCE: As with any aerobic biological process, the activated sludge process requires the feeding of a carbon source, trace nutrients and oxygen for energy and growth. The activated sludge that is in the two units must be fed and wasted sludge removed daily. Items on the following checklist should be performed daily. Sample collection and ASU feeding should be at the same time daily. Analyses should be performed as soon after sample collection as possible.

A. RETURN ALL BIOLOGICAL SOLIDS TO SOLUTION

1. Remove the bacteria from the sides of the aeration basin by swirling water in the reactor against the walls. If necessary, open the activated sludge units and scrape all biological growth from the sides of the vessels with a spatula.
2. Return any collected sludge to the aeration basin.
3. Dislodge all solids from tubing throughout the system by squeezing the tubing, driving solids into liquid. This is much more easily done when the tubing is full of water.
4. If sludge has been accumulating in the clarifier, increase the sludge return rate by adjusting the setting on the timer which controls the fraction of time that the sludge pumps operate. Do not change the sludge pump flow setting. This may require an adjustment on the aeration basin effluent pump setting, as well, to keep from overflowing the aeration basin. Sludge residence time in the clarifier should be kept to a minimum.
5. Similarly, if the level in the aeration basin is low, raise the position of the effluent tube that penetrates the cover plate of the aeration basin. Do not change the feed or effluent pump flow settings.

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6. Record all pump operation changes in the log book.

B. REMOVE WASTE SLUDGE

1. Remove the prescribed amount of waste sludge from the aeration basin. Save the amount of waste sludge needed for analyses (see Section C, below). The amount of sludge that is wasted from the reactor (blowdown) controls the mixed liquor suspended solids (MLSS) concentration which is to be kept constant. This is approximately equal to the active microorganism population in the reactor. Adjustments to the blowdown are to be made periodically, based on the results of MLSS analyses from several days before.
2. Record all changes to the blowdown rate in the log book.
3. Record daily blowdown volumes on the log sheet.
4. Plot the blowdown volumes on the blowdown graphs.

C. COLLECT SAMPLES

Samples are to be collected for analysis from the wastewater being fed at the reactor inlet (I), from the mixed liquor in the reactor (R), and from the ASU effluent (E) as prescribed in the sample schedule (see Section IV and Log Sheets). Only pH and alkalinity analyses are to be performed daily. The required analyses, collection frequencies, and sampling point locations are presented in Section IV of this Operating Instruction.

1. Take reactor mixed liquor samples from the sludge blowdown removed in B, above. Additional mixed liquor is not to be taken from the reactors because it would effect the concentration of VSS in the reactor (MLSS) and ASU operations in general. Samples collected must be homogenized prior to testing to assure that results reflect conditions in the ASU. ASU effluent samples should be kept cold until the time of analysis to prevent the loss of volatile organic contaminants such as methylene chloride. Containers sent to SA should be filled to the top, leaving no vapor space for volatilization.
2. Take effluent samples from the bottles in the styrofoam coolers downstream of the clarifiers.
3. Measure the volume of the total effluent from each ASU (sum of chilled and unchilled volumes).
4. Empty all effluent collection bottles.
5. Record the total effluent volumes from each ASU on the log sheet.
6. Plot the total effluent volumes on the effluent volume graph.
7. Obtain feed samples by mixing the correct ratio of sewage and PSW into a sample bottle when feeding the units as described in part E below.

D. REPACK EFFLUENT COOLERS WITH ICE OR REFREEZABLE PACKETS

1. If ice is being used, remove the water from the effluent

coolers and replace it with ice.

2. If refreezable packets are being used, replace melted packets with frozen packets obtained from the freezer in the water lab.
3. Place the melted packets in the freezer so that they may be used the next day.
4. Be sure that sample bottles are tightly capped and that tubing is secure to avoid spilling of ASU effluent inside the coolers.
5. Cover the coolers to minimize the entry of heat.

E. FEED THE BIOLOGICAL UNITS

1. Remove the cap from the feed bottle and mix in the appropriate amounts of sewage and paint stripping wastewater (PSW) to the unit which is to receive the PSW. Sewage and PSW should be kept refrigerated between feedings, and the storage container for each should be shaken to homogenize the contents prior to feeding. Add the sewage first so that pumping from the feed vessel during filling does not result in the feeding of concentrated paint stripping wastewater which would kill the ASU bacterial culture.
2. Mix the contents of the feed bottle and replace cap to minimize loss of volatiles. Some air entry is required to prevent a vacuum from forming.
3. Remove the cap from the "sewage only" feed bottle, and pour in the appropriate amount of homogenized sewage.
4. Record the amounts of sewage and PSW fed on the log sheet.
5. Plot the volumes fed on the appropriate feed graphs.
6. If the feed bottle was not empty, raise the setting on the feed pump timer.
7. Record the change in the setting in the log book.
8. If analyses on the feed solution are required, mix the same sewage-to-PSW ratio into a sample bottle, and do not remove samples for analysis from the feed bottle.

F. CHECK THE AIR SUPPLY

1. Record the air setting of the two units and the air supply pressure on the log sheet.
2. Adjust the air feed, if necessary, to the prescribed setting. Adjustments should be made on the rotometers and not on the supply pressure regulator.
3. Plot the average of the initial reading and the prescribed setting on the air supply plot.

G. CHECK FOR PUMP LEAKS AND MOVE PUMP TUBING

Leakage from the pump casing indicates that the tubing is worn out and must be replaced. Interruption of feed, mixed liquor removal, or sludge return to the ASU jeopardizes the entire study and must be corrected immediately.

1. Grease tubing going through each pump with stopcock grease.
2. Loosen and reset clamps as necessary.

3. Move tubing through the pump between half an inch and an inch.
4. Tighten clamps to prevent slipping of tubing through the pump, but be careful not to restrict flow in the tubing.

TO REPLACE TUBING, remove the pump from the pump drive and loosen any wires that attach the Tygon tubing going through the pump to other tubing at glass-tubing joints. Clamp suction and discharge tubing going to the ASU or keep the glass-tubing connections above the water level in the aeration basin to prevent spillage. Remove the worn tubing, and clean all sludge from pump casing and rollers. Cut a section of new Tygon tubing of the same length as that of the tubing that was removed. Grease the tubing, and install it in the pump. Close the casing, and mount the pump on the pump drive. Connect the pump tubing to the system and tighten the wires on the glass joints.

H. PERFORM REQUIRED ANALYSES and ADJUST FEED ALKALINITY
1. Check the lab analysis schedule for the required lab analyses of the day. Alkalinity and pH analyses are required every day.
2. Record the lab temperature on the log sheet.
3. Perform the analyses prescribed in the analysis schedule.
4. Based on effluent and reactor mixed liquor pH analysis results, adjust the alkalinity of the feed to the reactor as prescribed in the next section, if necessary.

VI. REACTOR pH, FEED ALKALINITY, AND BICARBONATE ADDITION: Alkalinity and pH analyses are required daily. The target effluent pH is 8.0. It is controlled by adjusting the alkalinity of the feed to the reactor. Because organic acids can be formed in the ASU, pH values in the reactor can drop, even if the feed pH is high. At no time should the pH in the reactor or effluent be allowed to drop below 6.8. The pH of the effluent should be the same as that of the reactor liquid. The contents of the cells in the reactor may not be at the same pH value as the water that surrounds the cells. Thus, reactor pH determinations should be performed on filtered samples. To prevent the reactor and effluent pH values from dropping below the minimum value of 6.8, the feed should be buffered, and the reactor pH response to changes in feed alkalinity monitored. When PSW feeding begins, the alkalinity of the feed should be set at 2000 mg/l as calcium carbonate or the alkalinity of raw sewage, whichever is greater. At no time should the alkalinity of the feed drop below 1000 mg/l as calcium carbonate. Values between 1000 and 5000 should be expected for the alkalinity of the feed. If an increase in the feed alkalinity is required, sodium bicarbonate should be added as needed. The sodium bicarbonate dosage increase should be calculated as follows:

$$m = (V)(C2 - C1)(100/84)(2)/1000$$

where C1 = reactor alkalinity (mg/l as calcium carbonate)
C2 = desired reactor alkalinity (mg/l as calcium carbonate)
V = system volume (= reactor volume + clarifier volume = 6 liters + 1 liter = 7 liters)
m = sodium bicarbonate dosage increase (grams/day)

IV. REQUIRED ANALYSES: The analyses listed in Table 1 below are needed to monitor the performance of the two ASU reactors. Because operating conditions are adjusted in response to values of key operating parameters, rapid analysis of samples to be analyzed in the water lab is essential. The Water Lab technician assigned by the NCOIC must collect samples from the locations specified in this section as part of the daily maintenance routine for the ASU reactors. Samples sent to SA for analysis must be preserved since their work load may not permit immediate analysis. No preservatives are required for samples to be analyzed in the water lab since they must be analyzed the same day they are taken. Samples awaiting analysis should be refrigerated to minimize loss of volatiles and continued biodegradation. Sample locations and collection frequencies (in times/week) are also given in Table 1.

Table 1
SAMPLE ANALYSIS SCHEDULE

ANALYSIS	LOCATION*	FREQUENCY	WHERE*
pH	I,R,E	2,7,2	WL
Alkalinity	I,E	7,7	WL
Soluble COD	I,E	1,2	WL
Total COD	I,E	1,2	WL
Soluble BOD5	I,E	1,2	WL
Total BOD5	I,E	1,2	WL
Volatile Suspended Solids (VSS)	R,E	2,2	WL
Total Suspended Solids (TSS)	R,E	2,2	WL
Sludge Volume Index (SVI)	R	1	WL
Ammonia-Nitrogen	E	1	WL
Nitrate-Nitrogen	E	1	WL
Nitrite-Nitrogen	E	1	WL
Phosphate-Phosphorous	E	1	WL
Conductivity	I,E	1,1	WL
Total Dissolved Solids (TDS)	I,E	1,1	WL
Hexavalent Chromium	I,E	2,2	WL
Total Chromium	I,E	2,2	WL
Phenol	I,E	2,2	WL
Oil and Grease	I,E	1,1	SA
Methylene Chloride	I,E	2,2	SA
Cadmium	I,E	2,2	SA

*I=Inlet, R=Reactor, E=Effluent, WL=Water Lab

VI. FEED SOLUTION STORAGE AND PREPARATION: Both PSW and sewage are to be kept refrigerated at all times to prevent the loss of

volatile contaminants, and utilization of nutrients due to biological growth outside the activated sludge units. Settings on refrigeration units are to be set at minimum values, and the wastewater is to be kept in the refrigeration unit in the water lab, if possible, since it maintains a lower temperature. All solutions should be kept in air-tight glass containers with Teflon-lined lids.

The inhibitory concentrations of chromium (III and VI) and phenol are 2 and 200 mg/l, respectively. Because methylene chloride is highly volatile, a published value for the corresponding threshold concentration for aerobic processes is not available. Each time wastewater is collected in the field, the results of characterization analyses must be used to determine the minimum sewage-to-wastewater dilution ratio (SWR):

$$VS/VW = (CW - CI)/CI = SWR$$

where VS = volume of sewage
VW = volume of wastewater
CW = concentration of contaminant in the wastewater
CI = inhibitory concentration

The SWR must be calculated for chromium and phenol, if present, and the larger ratio used in the preparation of feed solution. Cold wastewater and sewage are to be individually mixed to suspend any settled solids and homogenize the solution prior to removal from the storage vessels.

To characterize the full-strength PSW, all the analyses listed in Table 1 should be performed on duplicate samples each time wastewater is collected. If there is a significant difference between batches, contaminants should be added to the new batch to minimize variations in feed to the units.

VII. BIOLOGICAL REACTOR OPERATING SPECIFICATIONS: The biological reactors are to be operated under different operating conditions to ascertain growth and utilization parameters for the systems. Domestic sewage normally contains all the trace nutrients required for bacterial growth, is a readily available wastewater stream on Air Force bases, and can be used to dilute the paint stripping wastewater. Table 2 contains values of physical parameters, typical feed characteristics, and target operating values or ranges for the reactors.

Table 2
REACTOR OPERATING PARAMETERS

PARAMETER	VALUE
Reactor Volume, Vr	6 liters
Clarifier Volume, Vc	1 liter
Food-to-Microorganism Ratio, F:M	0.4 - 0.8 (mg/l BOD5)/(mg/l MLSS)
Feed Rate, Q	8 - 16 l/day
Hydraulic Detention Time, V/Q	0.4 - 0.8 days

BOD5 of Sewage	100 - 200 mg/l
COD of Sewage	150 - 300 mg/l
Reactor Temperature, T	20-25 degrees C
Sludge Volume Index, SVI	80 - 200
Mixed Liquor Suspended Solids, MLSS	3000 mg/l
Solids Retention Time	3 - 12 days
Oxygen Required	50 - 100 ml/min (60 cu. m air/kg BOD5 in feed)
Return Sludge Ratio, R/Q	0.4 - 1.0
Soluble BOD5 in Effluent	4 - 8 mg/l

GEORGE AFB SAMPLING RESULTS
SAMPLED BY VVWRA

SITE: GEORGE 1

PARAMETER	DATES	# SAMPLES/ # DET.	HIGH	LOW	AVG
NONANE	020485-032686	87/2	130	100	115
3-METHYL DECANE		87/1	50	50	50
METHYLETHIDENCYCHEXENE		87/1	110	ND	110
4-BUTOXY-1-BUTANOL		87/1	200	ND	200
M-PROPAN DI HYDRO PRO ESTER		87/1	40	ND	40
METHYL BROMIDE		87/2	25	8.7	16.4
METHYL CHLORIDE		87/1	10	ND	10
DECANOL		87/2	46	12	29
OCTADECANOIC ACID		87/5	190	41	72
THIOBISMETHANE		87/3	6	2.3	3.5
DIMETHYL DISULFIDE		87/4	10	4.8	6.2
TETRADECANOIC ACID		87/7	210	24	81
C3 ALKYL BENZENES		87/1	78	78	78
TRIMETHYLBICYCLOHEPTAN-3		87/2	55	18	36.5
2-PHENOXY ETHANOL		87/1	27	27	27
METHYL NAPHTHALENES		87/1	30	30	30
9-OCTADECANOIC ACID		87/2	62	57	59.5
STYRENE		87/1	59	59	59
2-CYCLOHEXANE		87/2	16	16	16
UNDECANE		87/3	9650	30	3237
PENTANOIC ACID		87/2	9	9	9
1-(2-BUTOXYETHOXY)ETHANOL		87/3	980	140	700
TRIDECANE		87/2	29	29	29
TETRADECANE		87/2	17	17	17
PENTADECANE		87/2	15	15	15
HEXADECANE		87/2	6	6	6
C12-C13 ALCOHOLS		87/2	31	31	31
DECANE		87/5	410	6	145
1-METHYLCYCLOHEX-1-OL		87/1	70	70	70
METHMETHETHCYCLOHEXANE		87/1	150	150	150
C9-ALKANES		87/2	51	10	31
C3-BENZENE ISOMERS		87/3	400	45	172
C4-BENZENE ISOMERS		87/1	40	40	40
HEXANOIC ACID		87/1	16	16	16
9-HEXDECANOIC ACID		87/1	16	16	16
5-ETHYL-2-METHYLHEPTANE		87/1	125	125	125
ORGANIC HALOGEN		87/1	<200	ND	<200
C8 HYDROCARBON		87/1	160	ND	160
C9 HYDROCARBON		87/1	410	ND	410
C10 HYDROCARBON		87/1	290	ND	290
C13 ALCOHOL		87/1	150	ND	150
C2 CYCLOOCTANE		87/1	220	ND	220
METHYLCYCLOHEXANE		87/1	130	130	130
C3-CYCLOHEXANE		87/1	380	380	380
TRIMETHYL DECANE		87/1	280	ND	280
3,4-DIMETHYL DECANE		87/1	110	ND	110
2,6,7-TRIMETHYL DECANE		87/1	270	ND	270

SITE: GEORGE 1

PARAMETER	DATES	# SAMPLES/ # DET.	HIGH	LOW	AVG
TRIMETHYL PENTANEDIOL		87/1	850	ND	850
C13 HYDROCARBON ISOMER		87/1	39	ND	39
A,A,4-TRIMETHYL-3-CYCLOHEXENE-1-METHANOL		87/2	2500	ND	1850
2-METHYLPROPANOIC ACID, 2,2-DIMETHYL-1-(2-HYDROXY-1-ISOPROPYL)PROPYL ESTER		87/1	960	ND	960
2-METHYLPROPANOIC ACID, 3-HYDROXY-2,4,4-TRIMETHYLPENTYL ESTER		87/1	710	ND	710
1-METHYL-4-1(1-METHYLETHYL)-7-OXABICYCLO/2.2.1/HEPTAINE		87/1	19	ND	19
2-METHYLCYCLOPENTANOL		87/1	48	ND	48
1-METHYL-3-(1-METHYLETHYL)BENZENE		87/1	12	ND	12
1,1,3-TRIMETHYL-2-OXABICYCLO/2.2.2/OCTANE		87/1	21	ND	21
METHYLOXABICHEPTANE		87/1	19	19	19
3-METHYLBUTANOIC ACID		87/1	6	6	6
TKN		87/2	39	32	36
NH3-N		87/2	25	17	21
T-P		87/2	32	8.5	20
2-(2-BUTOXYETHYL)ETHANOL		87/1	980	980	980
2-METHYLCYCLOPENTANOL		87/1	48	48	48
METHYLETHYLBENZENE		87/1	12	12	12
TRIMETHYLOXABICYCLOCTANE		87/1	21	21	21
BUTOXYBUTYRIC ACID		87/2	620	62	341
METHYLCYCLOHEXANE		87/1	70	70	70
XYLENES		87/1	29	29	29
C3-CYCLOHEXANE		87/1	24	24	24
(1,1-BIPHENYL)-2-OL		87/1	4	4	4
TRIMETHYLCYCLOHEXANE ISOMER		87/1	70	70	70
METHYLOCTANE ISOMER		87/1	21	21	21
Metals					
Ag		87/7	.02	<.005	<.008
As		87/6	.004	0.00	.002
Be		87/5	<.004	<.004	<.004
Cd		87/5	.02	.003	.009
Cr		87/5	.04	.029	.031
Cu		87/5	.19	.07	.11
Hg		87/2	.05	.00	.025
Ni		87/5	.02	.008	.011
Pb		87/6	<.05	.01	.038
S		87/1	<.01	<.01	<.01
Sb		87/6	.01	<.002	<.003
Se		87/5	<.01	.001	<.002
Tl		87/6	.005	<.005	<.005
Zn		87/6	.42	.11	.155

SITE: GEORGE 2

PARAMETER	DATES	# SAMPLES/ # DET.	HIGH	LOW	AVG
1,2-DICHLOROPROPANE	021986-031286	22/1	.7	.7	.7
TETRACHLOROETHENE		22/1	186	186	186
TOLUENE		22/1	11	11	11
TRICHLOROETHENE		22/1	171	171	171
CIS-1,2-DICHLOROETHENE		22/1	48	48	48
HEXADECANOIC ACID		22/2	190	92	141
DODECANOIC ACID		22/2	19	19	19
2-METHYLBUTANOIC ACID		22/1	46	46	46
BUTANOIC ACID		22/1	19	19	19
BENZENE ACETIC ACID		22/1	12	12	12
OCTADECANOIC ACID		22/1	93	93	93
TETRADECANOIC ACID		22/2	41	24	33
9-OCTADECANOIC ACID		22/1	110	72	91
1-(2-BUTOXYETHOXY)ETHANOL		22/2	21	16	19
TKN		22/1	44	44	44
NH3-N		22/1	22	22	22
T-P		22/1	13	13	13
2-(2-BUTOXYETHYL)ETHANOL		22/1	21	16	19
3-METHYLBUTANOIC ACID		22/1	34	34	34
PENTANOIC ACID		22/1	51	51	51
Metals					
Ag		22/4	.02	<.005	.01
As		22/4	<.001	<.001	<.001
Be		22/4	<.004	<.004	<.004
Cd		22/4	.02	.003	.01
Cr		22/4	<.029	<.029	<.029
Cu		22/4	.14	.01	.10
Hg		22/2	.01	.01	.01
Ni		22/4	.03	<.008	<.014
Pb		22/3	<.05	.01	<.04
Sb		22/4	<.002	<.002	<.002
Se		22/4	<.01	<.001	<.008
Tl		22/4	<.005	<.005	<.005
Zn		22/4	.19	.08	.11

SITE: GEORGE COMP

PARAMETER	DATES	# SAMPLES/ # DET.	HIGH	LOW	AVG
A,A,4-TRIMETHYL-3-CYCLOHEXENE-1-METHANOL	021186-050186	12/1	850	ND	850
1-METHYL-4-1(1-METHYLETHYL)-7-OXABICYCLO/2.2.1/HEPTANE		12/1	39	ND	39
1,3,3-TRIMETHYL-2-OXABICYCLO/2.2.2/OCTANE		12/1	96	ND	96
1-METHYL-4-(1-METHYLETHENYL)CYCLOHEXANOL		12/1	66	ND	66
4-METHYL-1-(1-METHYLETHYLIDENE)-CYCLOHEXENE		12/1	968	ND	968
3-METHYL-6-(1-METHYLETHYLIDENE)-CYCLOHEXENE		12/1	968	ND	968
C8 HYDROCARBON		12/1	3.5	ND	3.5
C9 HYDROCARBON		12/1	5.9	ND	5.9
C6 HYDROCARBON		12/1	26	ND	26
METHYLCYCLOHEXANE		12/1	5.3	ND	5.3
C7 CYCLOHEPTANE		12/1	48	ND	48
C10 CYCLOALKANE		12/1	15	ND	15
C9 CYCLOALKANE		12/1	8	ND	8
C3 BENZENE ISOMER		12/1	29	ND	29
C8 CYCLOPENTANE		12/1	4.3	ND	4.3
C13 HYDROCARBON		12/1	13	ND	13
m,p-XYLENES		12/1	38	38	38
o-XYLENES		12/1	17	17	17
BENZENE		12/1	7.5	7.5	7.5
CHLOROFORM		12/1	4	4	4

SITE: G IND

PARAMETER	DATES	# SAMPLES # DET.	HIGH	LOW	AVG
A,A,4-TRUMETHYL-3-CYCLOHEXENE-1-METHANOL	012786-072386	6/1	20	ND	20
1-METHYL-4-(1-METHYLETHYL)-3-CYCLOHEXEN-1-OL		6/1	22	ND	22
6-ISOPROPYLIDENE-1-ETHYLBIDYDLO/3.1.0/HEXANE		6/1	21	ND	21
OCTADECANOIC ACID		6/2	61	52	57
TETRADECANOIC ACID		6/2	63	30	47
9-OCTADECANOIC ACID		6/2	110	28	69
2-CYCLOHEXANE		6/1	0.4	0.4	0.4
UNDECANE		6/1	82	82	82
METHYLPENTANOIC ACID		6/1	5.8	5.8	5.8
BENZENE METHANOL		6/1	4.4	4.4	4.4
ETHYL METHYL BENZENES		6/1	140	140	140
TRIDEANE		6/1	21	21	21
DODECANE		6/1	37	37	37
TETRADECANE		6/1	25	25	25
PENTADECANE		6/1	20	20	20
HEXADECANE		6/1	8	8	8
DECANE		6/1	86	86	86
OCTANOIC ACID		6/1	39	39	39
6-ISOPROMETHYLBICHEXANE		6/1	21	21	21
1-METHYLCYCLOHEX-1-OL		6/1	22	22	22
9-OCTADECANOIC ACID		6/1	28	28	28
TRIMETHYCYCLOHEXANE		6/1	18	18	18
METHYLCYCLOHEXANE		6/1	29	29	29
ETHYLDIMETHYLCYCLOHEXANE		6/1	62	62	62
XYLENES		6/1	172	172	172
C3-CYCLOHEXANE		6/1	32	32	32
C13 ALKANES		6/1	36	36	36
C10 ALKANES		6/1	4.8	4.8	4.8
C8-C10 ALKANES		6/1	.5	.5	.5
2-BUTOXYETHANOL		6/1	7.8	7.8	7.8
TRIMETHCYCLOHEXMETHANOL		6/1	26	26	26
BUTANOIC ACID		6/1	16	16	16
BIS(2-ETHYLHEXYL)PHTHALATE		6/1	9	9	9
PHENOL		6/1	23	23	23
1,2-DICHLOROBENZENE		6/1	2	2	2
1,4-DICHLOROBENZENE		6/1	9	9	9
1,1-DICHLOROETHENE		6/1	.8	.8	.8
ETHYL BENZENE		6/1	130	130	130
TOLUENE		6/1	510	510	510
1,1,1-TRICHLOROETHANE		6/1	510	510	510
TRICHLOROETHENE		6/1	1.4	1.4	1.4
m,p-XYLENES		6/2	450	13	231.5
o-XYLENES		6/2	260	3.2	131.6
CIS 1,2-DICHLOROETHENE		6/1	6.1	6.1	6.1
METHYLCYCLOHEXANE		6/1	.9	.9	.9

SITE: G IND

PARAMETER	DATES	# SAMPLES # DET.	HIGH	LOW	AVG
C3 BENZENES		6/1	580	8.7	294.4
C4 BENZENES		6/1	5.6	5.6	5.6
METHYL PHENOL		6/1	5	5	5
TRIMETHYLBICYCLOHEXANOL		6/1	74	74	74
HEXADECANOIC ACID		6/2	160	130	145
DODECANOIC ACID		6/1	150	150	150
TRIMETHYLCYCLOHEXANE		6/1	.5	.5	.5
NAPTHALENE		6/1	10	10	10
BENZENE		6/1	140	140	140
CHLOROFORM		6/1	2.5	2.5	2.5
Metals					
Ag		6/2	<.005	<.005	<.005
As		6/2	.01	<.001	<.006
Be		6/2	<.004	<.004	<.004
Cd		6/1	.01	.01	.01
Cr		6/1	<.029	<.029	<.029
Cu		6/1	.09	.09	.09
Ni		6/2	<.008	<.008	<.008
Pb		6/1	.01	.01	.01
Sb		6/1	<.002	<.002	<.002
Se		6/1	<.001	<.001	<.001
Tl		6/1	<.005	<.005	<.005
Zn		6/1	.13	.13	.13

SITE: G RES

PARAMETER	DATES	# SAMPLES # DET.	HIGH	LOW	AVG
OCTADECANOIC ACID	012786	3/2	61	52	57
TETRADECANOIC ACID		3/2	63	30	47
2-CYCLOHEXANE		3/1	0.4	0.4	0.4
UNDECANE		3/1	82	82	82
3-METHYLBUTANOIC ACID		3/1	5.8	5.8	5.8
BENZENE METHANOL		3/1	4.4	4.4	4.4
ETHYLMETHYL BENZENES		3/1	140	140	140
TRIDECANE		3/1	21	21	21
DODECANE		3/1	37	37	37
TETRADECANE		3/1	25	25	25
PENTADECANE		3/1	20	20	20
HEXADECANE		3/1	8	8	8
OCTANOIC ACID		3/1	39	39	39
9-OCTADECANOIC ACID		3/1	110	110	110
TRIMETHYLCYCLOHEXANE		3/1	0.5	0.5	0.5
C9-ALKENES		3/1	0.5	0.5	0.5
BIS(2-ETHYLHEXYL)PHTHALATE		3/1	15	15	15
1,3-DICHLOROBENZENE		3/1	2.6	2.6	2.6
ETHYLBENZENE		3/1	2.8	2.8	2.8

SITE: G RES

PARAMETER	DATES	# SAMPLES # DET.	HIGH	LOW	AVG
TOLUENE		3/1	16	16	16
1,1,1-TRICHLOROETHANE		3/1	.2	.2	.2
m,p-XYLENES		3/1	13	13	13
o-XYLENES		3/1	3.2	3.2	3.2
METHYLCYCLOHEXENE		3/1	.9	.9	.9
C3 BENZENES		3/1	8.7	8.7	8.7
C4 BENZENES		3/1	5.6	5.6	5.6
METHYL PHENOL		3/1	6	6	6
HEXADECANOIC ACID		3/1	160	160	160
DODECANOIC ACID		3/1	150	150	150
TRIMETHYLCYCLOHEXANE		3/1	18	18	18
C10 ALKANES		3/2	120	4.8	62.4
C10-C13 ALKANES		3/1	36	36	36
C3 CYCLOHEXANE		3/1	32	32	32
C8-C10 ALKANES		3/1	62	62	62
2-BUTOXYETHANOL		3/2	10	7.8	8.9
TRIMETHCYCLOHEXMETHANOL		3/2	510	26	268
BUTANOIC ACID		3/1	10	10	10
TRIMETHYBICYCLOHEPT-2-EN		3/1	74	74	74
DECANOIC ACID		3/1	16	16	16
BENZENE		3/1	1.7	1.7	1.7
CHLOROFORM		3/1	3.2	3.2	3.2

SITE: GAFB PP

PARAMETER	DATES	# SAMPLES # DET.	HIGH	LOW	AVG

SITE: C11

PARAMETER	DATES	# SAMPLES # DET	HIGH	LOW	AVG
OCTADECANOIC ACID	012786	1/1	120	120	120
THIOBISMETHANE		1/1	4.7	4.7	4.7
DIMETHYLDISULFIDE		1/1	6.2	6.2	6.2
TETRADECANOIC ACID		1/1	37	37	37
9-OCTADECANOIC ACID		1/1	320	320	320
3-METHYLBUTANOIC ACID		1/1	20	20	20
PENTANOIC ACID		1/1	14	14	14
BENZENE ACETONITRILE		1/1	12	12	12
1-(2-BUTOXYETHOXY)ETHANOL		1/1	25	25	25
BENZOIC ACID		1/1	27	27	27
C4-CYCLOHEXENE		1/1	15	15	15

SITE: BUILDING 18

PARAMETER	DATES	# SAMPLES # DET.	HIGH	LOW	AVG

SITE: BUILDING 219

PARAMETER	DATES	# SAMPLES # DET	HIGH	LOW	AVG
OCTADECANOIC ACID	020485-012886	11/3	200	20	113
THIOBISMETHANE		11/1	4.7	4.7	4.7
DIMETHYLDISULFIDE		11/1	6.2	6.2	6.2
TETRADECANOIC		11/3	40	18	32
9-OCTADECANOIC ACID		11/2	320	26	173
STYRENE		11/1	9.7	9.7	9.7
3-METHYLBUTANOIC		11/1	20	20	20
PENTANOIC ACID		11/1	14	14	14
BENZENE ACETONITRILLE		11/1	14	14	14
BENZOIC ACID		11/1	27	27	27
PHENOL		11/2	7.3	4.4	5.85
BIS(2-ETHYLHEXYL)PHTHALATE		11/4	65	4.3	35.6
1,2-DICHLOROBENZENE		11/2	1.8	1.6	1.7
1,3-DICHLOROBENZENE		11/2	4.8	.5	2.65
1,4-DICHLRORBENZENE		11/2	2.4	1.0	1.7
DI-N-BUTYLPHTHALATE		11/1	4.5	4.5	4.5
DICHLOROBROMOMETHANE		11/2	7.4	.4	3.9
1,2-DICHLOROETHANE		11/1	1.2	1.2	1.2
1,1-DICHLOROETHENE		11/3	2.4	1.6	2.03
ETHYL BENZENE		11/4	37	.2	10.2
METHYLENE CHLORIDE		11/3	1350	15	466.7
TETRACHLOROETHENE		11/5	440	3.8	104.4
TOLUENE		11/5	300	1.8	65.3
1,1,1-TRICHLOROETHANE		11/5	12	1	5.7
TRICHLOROETHENE		11/4	310	2.8	124
m,p-XYLENES		11/3	14	.8	10.6
o-XYLENE		11/3	6.2	.8	3.6
CIS 1,2-DICHLOROETHENE		11/3	17	1	6.5
METHLCYCLOHEXANE		11/1	2.2	2.2	2.2
C3 BENZENES		11/2	10	6	8
METHYLPHENOL		11/2	1616	4	810
HEXADECANOIC ACID		11/3	250	49	136
DODECANOIC ACID		11/3	34	20	26.3
ACETONE		11/1	36	36	36
C8-C9 CYCLIC ALKANES		11/2	20	15	17.5
C9-C12 ALKANES		11/1	9	9	9
C10 ALKANE		11/1	.7	.7	.7
2-BUTOXY ETHANOL		11/1	25	25	25
TRIMECYCLOHEXMETHANOL		11/3	130	21	66
2-METHYLBUTANOIC ACID		11/1	18	18	18
BUTANOIC ACID		11/2	10	4	7
BENZENE ACETIC ACID		11/3	18	8	12

SITE: BUILDING 219

PARAMETER	DATES	# SAMPLES # DET	HIGH	LOW	AVG
TRIMETHYLBICYCLOHEPT-2-EN		11/2	10	4	7
DECANOIC ACID		11/1	10	10	10
NAPTHALENE		11/3	900	370	723.3
BENZENE		11/1	61	61	61
DIBROMOCHLOROMETHANE		11/1	.2	.2	.2
CHLOROFORM		11/5	20	3.2	10.7

SITE: BUILDING 645

PARAMETER	DATES	# SAMPLES # DET.	HIGH	LOW	AVG
4-NONYLPHENOL	070386	5/1	3800	ND	3800
4-NONYLPHENOLMONOETHOXYLATES		5/1	4500	ND	4500
HEXANEDIOIC ACID, DIOCTYLESTER		5/1	2600	ND	2600
PENTACOSANE		5/1	57000	ND	57000
8-METHYL-1-DECENE		5/1	68	ND	68
2-METHYLNONANE		5/1	58	ND	58
5-ETHYL-2-METHYLHEPTANE		5/1	91	ND	91
ETHYLMETHYLBENZENES		5/1	91	91	91
DECANE		5/1	220	220	220
4-NONYL PHENOL		5/1	3800	3800	3800
NONYLPHENOLMONOETHOXYLATE		5/1	4500	4500	4500
HEXANEDIOIC A, DIOTYLESTER		5/1	2600	2600	2600
PENTACOSANE		5/1	57000	57000	57000
3-METHYLNONANE		5/1	58	58	58
1-ETHYL-4-METHYL CYCLOHEXANE		5/1	52	52	52
2,3,7-TRIMETHYLOCTANE		5/2	62	62	62
8-METHYL-1-DECENE		5/1	68	68	68
2,3,6-TRIMETHYLOCTANE		5/2	140	14	77
METHMETHETHCYCLOHEXANE		5/2	81	81	81
METHYLCYCLOHEXANE		5/2	52	52	52
ETHYLDIMETHYLCYCLOHEXANE		5/1	52	52	52
BIS(2-ETHYLHEXYL)PHTHALATE		5/1	640	640	640
1,2-DICHLOROBENZENE		5/2	64	36	50
1,3-DICHLOROBENZENE		5/1	23	23	23
1,4-DICHLOROBENZENE		5/1	13	13	13
o-XYLENE		5/1	25	25	25
Metals					
Ag		5/1	<.005	<.005	<.005
As		5/1	.01	.01	.01
Be		5/1	<.004	<.004	<.004
Cd		5/1	.15	.15	.15
Cr		5/1	.05	.05	.05
Cu		5/1	.1	.1	.1
Ni		5/1	.04	.04	.04
Pb		5/1	.07	.07	.07

SITE: BUILDING 645

PARAMETER	DATES	# SAMPLES # DET.	HIGH	LOW	AVG
Sb		5/1	<.002	<.002	<.002
Se		5/1	<.001	<.001	<.001
Tl		5/1	<.005	<.005	<.005
Zn		5/1	.3	.3	.3

SITE: BUILDING 652

PARAMETER	DATES	# SAMPLES # DET.	HIGH	LOW	AVG

SITE: BUILDING 676

PARAMETER	DATES	# SAMPLES # DET.	HIGH	LOW	AVG

SITE: BUILDING 683

PARAMETER	DATES	# SAMPLES # DET.	HIGH	LOW	AVG
ORGANIC HALOGEN	072386	3/1	82	ND	82
3-METHYL-2-CYCLOHEXEN-1-ONE		3/1	18	ND	18
NO2-N		3/1	1.3	1.3	1.3
NO3-N		3/1	.64	.64	.64
TKN		3/1	.31	.31	.31
3-METHYLCYCLOHEX-1-ONE		3/1	18	18	18
Metals					
Ag		3/2	<.005	<.005	<.005
As		3/2	<.004	<.004	<.004
Be		3/2	<.004	<.004	<.004
Cd		3/1	.01	.01	.01
Cr		3/1	<.029	<.029	<.029
Cu		3/1	.02	.02	.02
Ni		3/1	.01	.01	.01
Pb		3/2	.01	.01	.01
Sb		3/2	.01	<.002	<.006
Se		3/2	<.002	<.001	<.002
Tl		3/2	<.005	<.001	<.003
Zn		3/2	.31	<.005	.16

SITE: BUILDING 685

PARAMETER	DATES	# SAMPLES # DET.	HIGH	LOW	AVG

SITE: BUILDING 686

PARAMETER	DATES	# SAMPLES # DET.	HIGH	LOW	AVG
1,2-DIMETHYLCYCLOPENTANE	030586-070386	10/1	25	ND	25
1,3-DIMETHYLCYCLOHEXANE		10/1	66	ND	66
3-ETHYLHEXANE		10/1	110	ND	110
1,1,3-TRIMETHYLCYCLOHEXANE		10/1	25	ND	25
2,3,4-TRIMETHYLHEXANE		10/1	25	ND	25
1-ETHYL-4-METHYLCYCLOHEXANE		10/1	40	ND	40
4-METHYLOCTANE		10/1	180	ND	180
1,3,5-TRIMETHYLBENZENE		10/1	300	ND	300
2,2,3-TRIMETHYLPENTANE		10/1	85	ND	85
3-METHYLPENTANE		10/1	2930	ND	2930
METHYLCYCLOPENTANE		10/1	550	ND	550
1-ETHYLIDENE-1-H-IDENE		10/1	2500	ND	2500
2,2,3,4-TETRAMETHYLPENTANE		10/1	91	ND	91
METHYLNAPHTHALENES		10/1	5900	5900	5900
9-OCTADECANOIC ACID		10/1	2900	2900	2900

SITE: BUILDING 686 Cont'd

PARAMETER	DATES	# SAMPLES # DET.	HIGH	LOW	AVG
1-(2-BUTOXYETHOXY)ETHANOL		10/1	15000	15000	15000
DIHYDROTRIMETHYLPURDIONE		10/1	3400	3400	3400
DECANE		10/1	270	270	270
1-METHYLNAPHTHALENE		10/1	4400	4400	4400
2-METHYLNAPHTHALENE		10/1	2900	2900	2900
DIMETHYLNAPHTHALENE		10/1	4800	4800	4800
PENTANE		10/2	88	88	88
2,2,3-TRIMETHYLPENTANE		10/1	85	85	85
3-METHYLPENTANE		10/1	2930	2930	2930
METHYI CYCLOPENTANE		10/1	550	550	550
1-ETHYLIDENE-1-HINDENE		10/1	2500	2500	2500
1-METHYLNAPTHALENE		10/1	1290	1290	1290
TRIMETHYLDECANE ISOMER		10/2	3600	3600	3600
TRIMETHYLBENZENE ISOMER		10/2	300	300	300
2,3,4-TRIMETHYLPENTANE		10/1	91	91	91
1-METHYL-2-PROPYL BENZENE		10/2	270	270	270
C12 H24 ALKENE		10/2	6600	6600	6600
PENTACOSANE		10/1	25	25	25
1,3,5-TRIMETHYL BENZENE		10/1	300	300	300
12-PROPYLFURAN		10/1	120	120	120
DIMETHYLCYCLOPENTANE		10/1	25	25	25
3-ETHYLHEXANE		10/1	110	110	110
2,3,4-TRIMETHYLHEXANE		10/1	40	40	40
4-METHYLOCTANE		10/1	180	180	180
ACENAPHTHALENE		10/1	15	15	15
FLUORENE		10/1	10	10	10
1,2,4-TRICHLOROBENZENE		10/1	4	4	4
2,4-DIMETHYLPHENOL		10/1	190	190	190
DIMETHYLPHENOL ISOMERS		10/1	440	440	440
2-ETHYL-1-HEXANOL		10/1	4000	4000	4000
HEPTANOIC ACID		10/1	5500	5500	5500
NONANOIC ACID		10/1	7400	7400	7400
DIMETHYLNAPHTHALENE		10/2	4800	4000	4400
C3-BENZENE ISOMERS		10/1	2000	2000	2000
C4-BENZENE ISOMERS		10/1	1100	1100	1100
TRIMETHYLCYCHEXANE ISOMERS		10/1	100	100	100
METHYLOCTANE ISOMERS		10/1	250	250	250
PHENANTHRENE		10/1	4	4	4
PYRENE		10/1	.7	.7	.7
PHENOL		10/2	240	180	210
BIS(2-ETHYLHEXYL)PHTHALATE		10/3	100	52	84
1,2-DICHLOROBENZENE		10/3	1200	110	490
1,3-DICHLOROBENZENE		10/2	1400	100	750
1,4-DICHLOROBENZENE		10/3	900	150	503
FLUORANTHENE		10/1	50	50	50
1,1-DICHLOROETHANE		10/2	61	20	40.5
1,2-DICHLOROETHANE		10/1	350	350	350
ETHYLBENZENE		10/3	200	39	100
METHYLENE CHLORIDE		10/3	1500	440	970

SITE: BUILDING 686 Cont'd

PARAMETER	DATES	# SAMPLES # DET.	HIGH	LOW	AVG
TETRACHLOROETHENE		10/3	12000	12000	12000
TOLUENE		10/3	500	180	303
1,1-DICHLOROETHENE		10/1	290	290	290
1,1,1-TRICHLOROETHANE		10/2	4200	2000	3100
TRICHLOROETHENE		10/3	250	46	142
m,p-XYLENES		10/2	180	160	170
o-XYLENES		10/2	65	51	58
METHYLCYCLOHEXENE		10/1	150	150	150
METHYLPHENOL		10/1	500	500	500
BENZENE		10/1	70	70	70
Metals					
Ag		10/2	.12	.09	.11
As		10/1	<.001	<.001	<.001
Be		10/2	<.004	<.004	<.004
Cd		10/1	.47	.47	.47
Cr		10/1	.36	.36	.36
Ni		10/1	.54	.54	.54
Pb		10/1	.14	.14	.14
Sb		10/1	.01	.01	.01
Se		10/1	<.001	<.001	<.001
Tl		10/1	<.005	<.005	<.005
Zn		10/1	1.4	1.4	1.4

SITE: BUILDING 755

PARAMETER	DATES	# SAMPLES # DET.	HIGH	LOW	AVG
1,1,3-TRIMETHYLCYCLOHEXANE	070286	3/1	160	ND	160
3,3-DIMETHYL-1-METHYL-2,4-AZETIMEDIONE		3/1	66	ND	66
PROPYLCYCLOHEXANE		3/1	66	ND	66
3-METHYLNONANE		3/1	910	ND	910
1,5-DIMETHYLCYCLOOCTANE		3/1	480	ND	480
1,3,5-TRIMETHYLBENZENE		3/1	700	ND	700
UNDECANE		3/1	17000	17000	17000
TRIDECANE		3/1	32000	32000	32000
DODECANE		3/1	21000	21000	21000
TETRADECANE		3/1	34000	34000	34000
PENTADECANE		3/1	11000	11000	11000
DECANE		3/1	11000	11000	11000
1-METHYLNAPHTHALENE		3/1	6100	6100	6100
2-METHYLNAPHTHALENE		3/1	28000	28000	28000
DIMETHYLNAPHTHALENE		3/1	22000	22000	22000
UNIDENTIFIED COMPOUNDS		3/1	1500000	1500000	1500000
TRIMETHYLCYCLOHEXANE		3/1	160	160	160
DIMETHYLMETHYLAZETIMED		3/1	66	66	66
PROPYLCYCLOHEXANE		3/1	66	66	66
3-METHYLNONANE		3/1	910	910	910

SITE: BUILDING 755 Cont'd

PARAMETER	DATES	# SAMPLES # DET.	HIGH	LOW	AVG
DIMETHYLCYCLOOCTANE		3/1	480	480	480
1,3,5-TRIMETHYLBENZENE		3/1	700	700	700
PYRENE		3/1	52	52	52
BIS(2-ETHYLHEXYL)PHTHALATE		3/1	4800	4800	4800
FLUORANTHENE		3/1	50	50	50
1,1-DICHLOROETHANE		3/1	55	55	55
ETHYLBENZENE		3/1	140	140	140
m,p-XYLENES		3/1	620	620	620
o-XYLENES		3/1	360	360	360
Metals					
Ag		3/1	<.005	<.005	<.005
Be		3/1	<.004	<.004	<.004
Cd		3/1	.16	.16	.16
Cr		3/1	.06	.06	.06
Cu		3/1	.12	.12	.12
Hg		3/1	<.0002	<.0002	<.0002
Ni		3/1	.05	.05	.05
Pb		3/1	.05	.05	.05
Sb		3/1	.01	.01	.01
Se		3/1	<.001	<.001	<.001
Tl		3/1	<.005	<.005	<.005
Zn		3/1	.22	.22	.22

BOD5 RESULTS (mg/L), SITES 1-11

Site #	#Samples	High	Low	Avg
1	18	185	90	128
3	17	175	93	145
4	6	610	280	404
5	11	155	78	104
6	14	220	93	167
7	20	245	120	168
8	16	265	150	189
9	15	180	77	110
10	5	220	50	130
11	4	110	63	80

Attachment

Atch 6

WASTEWATER CHARACTERIZATION ADDITIONAL PARAMETERS

Sites #		1	2	3	4	5	6
Parameters	(units)						
TOC	mg/L	58	9	76	237	44	84
Oils/Grease	"	20	4.1	30	49(5)	64	49
Tot. Ext. HC.	"	3.0	1.7	3.5	6.4(5)	5.4	4.2
NH3-N	"	18	0.2	24	15	17	21
TKN	"	23	1.0	29	26	21	27
O-Phosphate	"	13.4	14.5	14.6	18.2	10.9	9.8
Phosporous	"	11.5	4.5	9.6	12	6.9	7.8
Cyanide	"	.01(5)	<0.01	0.2	0.03(4)	.01(3)	.01(5)
Tot. Ext. Phenols	ug/l	53	<10	79	497	103(4)	121(6)
TOX		172	NS	NS	NS	NS	NS
As	"	<100	<100	<100	<100	<100	<100
Cd	"	<10	<10	13(2)	14(1)	14(1)	<10
Cr	"	<50	<50	<50	<50	<50	<50
Cu	"	71	<16	43(6)	64	48	28(5)
Pb	"	<50	<50	<50	75(2)	<50	62(1)
Hg	"	3(5)	<1	7(3)	4	<1	2(5)
Ni	"	<50	<50	<50	<50	250(1)	<50
Se	"	<100	<100	<100	<100	120(1)	<100
Ag	"	12(2)	21(1)	16(1)	10(1)	20(1)	20(2)
Zn	"	122	<50	108(6)	324	63(5)	127
At	"	<10	<10	<10	<10	<10	<100
Be	"	250(1)	<10	<10	<10	<10	<10
Tl	"	<10	200	220(1)	<10	270(1)	200(1)
B	"	254	385	661	459(6)	238	607
Fe	"	3631	220	57K	7141	15,416	3627
Cl	mg/l	52	82	124	47	36	39
Specif Cond.	umhos	545	434	834	536	455	467
SO4	mg/l	17	57	55	6	10	8(5)
MBAS	"	2.5	0.2	2.7	3.6	2.5	2.7
Total Alk.	"	261	65	349	268	211	253
Sulfides	"	11(3)	8	8(2)	4	4	6(6)

WASTEWATER CHARACTERIZATION ADDITIONAL PARAMETERS (CONT.)

Parameters	Units	Sites # 7	8	9	10	11
TOC	mg/L	109	87	55	25	36
Oils/grease	"	16.7	176	49(6)	33	17.7
Tot. Ext. HC	"	4.1	28	5.9(6)	6.1	5.5
NH3-N	"	24	23	25	10.8	19
TKN	"	30	29	35	14	21
O-Phosphate	"	14	10.8	8.2	4.9	15
Phosphorous	"	10.4	9.9	8.3	4.0	9
Cyanides	"	.08(6)	.02(5)	.01(4)	.01(6)	<.01
T.E. Phenols	ug/L	168	252	38(6)	1444(4)	16(2)
TOX	"	NS	171	127	NS	NS
As	"	130(1)	<100	<100	<100	<100
Cd	"	<10	<10	<10	<10	20(1)
Cr	"	<10	<50	<50	<50	<50
Cu	"	44	167	271	24(1)	23(4)
Pb	"	<50	<50	175(2)	73(1)	<50
Hg	"	2(3)	2(1)	2(1)	2(3)	1(1)
Ni	"	<50	<50	<50	<50	<50
Se	"	<100	130(1)	<100	<100	400(2)
Ag	"	12(2)	42(2)	12(1)	11(1)	29(1)
Zn	"	116(6)	171	93	71(5)	98
At	"	<100	<100	<10	<100	<100
Be	"	<10	100(1)	<10	<10	<10
Tl	"	280(1)	60(2)	130(1)	<100	130(1)
B	"	1349	369	787	247	679
Fe	"	73K	1927	2306	3304	3993
Cl	mg/L	41	54	44	53	133
Spec. Cond.	"	539	675	619	583	1047
SO4	"	9	27(6)	39	72	227
MBAS	"	3.4	5.3	2.3	1.8	1.5
Tot. Alk.	"	301	327	313	240	267
Sulfides	"	6	26(5)	8(1)	8(3)	5

note: NS means not sampled for at that site

EPA METHOD 624 RESULTS
VOLATILE ORGANIC COMPOUNDS RESULTS

Parameter	Total # Analyzed	# Observed	High	Low ug/L	Avg of Detected values
Chloromethane					
STP Influent	6	1			11
George #1	7	1			12
George #2	6	0			
Vinyl Chloride					
STP Influent	6	0			
George #1	7	1			35
George #2	6	0			
Dichloromethane (methylene chloride)					
STP Influent	6	6	440	110	190
George #1	7	7	310	110	168
George #2	6	5	440	80	250
Trichlorofluoromethane					
STP Influent	6	3	19	6	10.5
George #1	7	6	20	4	8.6
George #2	6	4	8	4.2	5.4
Chloroform					
STP Influent	6	1			2.1
George #1	7	1			5
George #2	6	0			
Trichloroethene					
STP Influent	6	0			
George #1	7	1			5
George #2	6	0			
Benzene					
STP Influent	6	1			7
George #1	7	5			19.8
George #2	6	0			
Tetrachloroethene					
STP Influent	6	1			5.1
George #1	7	2	9.3	9.0	9.2
George #2	6	0			
Toluene					
STP Influent	6	1			12
George #1	7	5	210	24	83
George #2	6	0			
Ethyl Benzene					
STP Influent	6	0			
George #1	7	4	47	14	24
George #2	6	0			

Atch 8

Additional Volatiles

Acetone					
STP Influent	6	6	500	11	187
George #1	7	7	172	60	109
George #2	6	6	170	43	119
Trimethyl Silanol					
STP Influent	6	1			12
George #1	7	1			32
George #2	6	1			48
Carbon Disulfide					
STP Influent	6	1			7
George #1	7	2	45	15	30
George #2	6	0			
Xylene					
STP Influent	6	1			13
George #1	7	5	280	34	114
George #2	6	1			170
Ethane, 1,1,2 trichloro trifluoro					
STP Influent	6	1			25
George #1	7	0			
George #2	6	0			
Tetrahydrofuran					
STP Influent	6	1			15
George #1	7	1			34
George #2	6	3			104
4 methyl 2-Pentanone					
STP Influent	6	1			7
George #1	7	0			
George #2	6	1			
1,4 Dioxane					
STP Influent	6	1			190
George #1	7	0			
George #2	6	0			
Cineole (van)					
STP Influent	6	2	120	7	64
George #1	7	1			25
George #2	6	0			
2H Pyran-2 one, tetrahydro, dimethyl					
STP Influent	6	0			
George #1	7	1			.5
George #2	6	0			
1,3 dimethyl, cis-Cyclohexane					
STP Influent	6	0			
George #1	7	1			8
George #2	6	0			

2-Propanol					
STP Influent	6	0			
George #1	7	0			
George #2	6	2	9.7	9	9.4
Octadecane					
STP Influent	6	1			8
George #1	7	0			
George #2	6	0			
Cyclohexane, trimethyl					
STP Influent	6	0			
George #1	7	1			207
George #2	6	0			
2-Butanone					
STP Influent	6	0			
George #1	7	1			7
George #2	6	0			
Ethyl methyl Benzene					
STP Influent	6	0			
George #1	7	1			15
George #2	6	0			
4-Carene					
STP Influent	6	0			
George #1	7	1			6
George #2	6	0			
1,3,6 Heptatriene,2,5,5, trimethyl					
STP Influent	6	0			
George #1	7	1			6
George #2	6	0			
Borneol					
STP Influent	6	1			17
George #1	7	0			
George #2	6	0			
2-Hepanone, 3-propylidene					
STP Influent	6	0			
George #1	7	24			
George #2	6	0			
Ethanol, 2-((phenyl methyl)amino)					
STP Influent	6	0			
George #1	7	1			24
George #2	6	0			

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EPA METHOD 625 RESULTS
ACID/BASE/NEUTRAL EXTRACTABLE ORGANIC COMPOUNDS RESULTS

Parameter	Total # Analyzed	# Observed	ug/L High	ug/L Low	Avg of detected values
Phenol					
STP Influent	7	6	63	46	50
George #1	7	5	130	37	73
George #2	7	4	50	37	46
1,4 dichlorobenzene					
STP Influent	7	0			
George #1	7	3	11	7	8
George #2	7	1			6.9
2,4 dimethyl phenol					
STP Influent	7	0			
George #1	7	1			19
George #2	7	0			
Napthalene					
STP Influent	7	1			3.6
George #1	7	4	21	33	28
George #2	7	0			
Diethyl phthalate					
STP Influent	7	7	6.8	15	11
George #1	7	7	23	8.6	16
George #2	7	7	73	6.4	23
Pentachlorophenol					
STP Influent	7	1			17
George #1	7	1			10
George #2	7	1			8.4
di-n butyl phthalate					
STP Influent	7	4	8.2	2.9	5
George #1	7	4	5.2	3.1	4
George #2	7	4	11	2.1	5
Benzyl-butyl phthalate					
STP Influent	7	3	38	8.9	28
George #1	7	5	27	8.5	17
George #2					
bis (2-ethyl hexyl) phthalate					
STP Influent	7	7	110	36	72
George #1	7	7	170	28	84
George #2	7	6	160	4.9	68
di-n-octylphthalate					
STP Influent	7	1			5
George #1	7	3			3.6
George #2	7	0			

Additional Semi-volatile Organics

4-methyl phenol					
STP Influent	7	4	620	190	325
George #1	7	4	790	200	380
George #2	7	2	210	164	187
Benzeneacetic Acid					
STP Influent	7	5	260	140	210
George #1	7	5	240	130	188
George #2	7	5	190	50	135
1,3 Dihydro-2H-Indole-2-one					
STP Influent	7	4	120	53	76
George #1	7	0			
George #2	7	2	100	41	70
Nonyl phenol					
STP Influent	7	4	30	7.2	16
George #1	7	3	49	26	36
George #2	7	0			
Benzoic Acid					
STP Influent	7	0			
George #1	7	0			
George #2	7	1			80
1,1-[biphenyl]-2-ol					
STP Influent	7	0			
George #1	7	0			
George #2	7	1			19
Tetradecanoic Acid					
STP Influent	7	1			310
George #1	7	1			92
George #2	7	3	130	68	92
Hexadecanoic Acid					
STP Influent	7	0			
George #1	7	1			130
George #2	7	2			300
Phenyl Propanedioic Acid					
STP Influent	7	1			150
George #1	7	0			
George #2	7	0			
4 Nonylphenol					
STP Influent	7	1			28
George #1	7	0			
George #2	7	0			
2 Butoxyethanol Phosphate					
STP Influent	7	1			64
George #1	7	0			
George #2	7	0			

Octadecanoic Acid					
STP Influent	7	3	170	10	78
George #1	7	2	120	550	335
George #2	7	2	210	63	136
3-Nitro-1,2 Benzenedicarboxylic Acid					
STP Influent	7	0			
George #1	7	1			150
George #2	7	0			
Caffeine					
STP Influent	7	1			31
George #1	7	0			
George #2	7	2	48	38	43
Alpha, alpha, 4-trimethyl-cyclohexane methanol					
STP Influent	7	3	310	210	220
George #1	7	5	4800	470	1930
George #2	7	3	160	32	107
2,3-dihydro-4-mehtyl-1H-indole					
STP Influent	7	1			75
George #1	7	0			
George #2	7	0			
Decane					
STP Influent	7	0			
George #1	7	1			320
George #2	7	0			
Squalene					
STP Influent	7	0			
George #1	7	1			210
George #2	7	1			170
4-Tetramethylbutyl phenol					
STP Influent	7	0			
George #1	7	1			60
George #2	7	1			19
1-Hexadecanol					
STP Influent	7	0			
George #1	7	0			
George #2	7	1			380
Octanoic Acid					
STP Influent	7	1			950
George #1	7	0			
George #2	7	1			49
9-Octadecane					
STP Influent	7	0			
George #1	7	1			150
George #2	7	0			

1,3,3 trimethyl-bicyclo [2.2.1]-Heptan-2 ol					
STP Influent	7	0			
George #1	7	1			560
George #2	7	0			
1-methyl-4-(1-methylethyl)-3-cyclohexen-1-ol					
STP Influent	7	0			
George #1	7	1			800
George #2	7	0			
Hexanoic Acid					
STP Influent	7	1			78
George #1	7	0			
George #2	7	0			
Dodecanoic Acid					
STP Influent	7	1			44
George #1	7	0			
George #2	7	1			64
2-methyl benzonitrile					
STP Influent	7	0			
George #1	7	1			100
George #2	7	0			
2-methyl 1H Indole					
STP Influent	7	1			200
George #1	7	1			150
George #2	7	0			
2 methylhexanoic Acid					
STP Influent	7	1			94
George #1	7	0			
George #2	7	0			
Benzene acetonitrile					
STP Influent	7	1			150
George #1	7	0			
George #2	7	0			
Benzeneproprionic Acid					
STP Influent	7	1			120
George #1	7	0			
George #2	7	0			
Ethylmethylbenzene					
STP Influent	7	0			
George #1	7	2	200	79	140
George #2	7	0			
Trimethylbenzene					
STP Influent	7	0			
George #1	7	2	480	190	335
George #2	7	0			

Diethylbenzene					
STP Influent	7	0			
George #1	7	2	340	120	230
George #2	7	0			
Pentanoic Acid					
STP Influent	7	0			
George #1	7	0			
George #2	7	1			56
Hexadecanoic Acid					
STP Influent	7	0			
George #1	7	1			
George #2	7	2	500	100	130 300

OIL/WATER SEPARATOR RESULTS

Characteristic Hazardous Waste Analysis

Site #	EP TOX mg/L								DRGC	pH	CN	S
	As	Ba	Cd	Cr	Pb	Hg	Ag	Se	Ig.	Cor.	Reac.	
12	ND	1	.06	.4	1.3	.004	.05	ND	N-I	NS	NS	NS
13	ND	.2	.01	.2	1.9	ND	ND	ND	N-I	NS	NS	NS
14	ND	.2	ND	ND	ND	ND	ND	ND	N-I	7.5	NS	NS
15	ND	.2	ND	ND	ND	ND	ND	ND	N-I	7.6	34	NS
16	ND	.1	ND	.3	.3	.14	ND	ND	N-I	NS	NS	NS
17	ND	.1	ND	.09	ND	ND	ND	ND	N-I	NS	NS	NS
18	.03	.2	.02	.2	1.1	ND	ND	ND	N-I	NS	NS	NS
19	ND	.3	ND	ND	ND	ND	ND	ND	N-I	7.4	70	0.4
20	ND	.2	.06	.3	1.3	ND	ND	.02	N-I	NS	NS	NS
21	ND	.1	.14	.3	.1	ND	ND	.02	N-I	NS	NS	NS
22	ND	1.6	1.7*	4.8	4.5	ND	ND	.02	N-I	NS	NS	NS
23	ND	17.	75.*	180.*	180.*	.009	.05	.03	N-I	NS	NS	NS
24	ND	1.3	2.4	8.2	6.3	.005	ND	.02	N-I	NS	NS	NS
25	ND	.2	.04	.4	.2	ND	ND	ND	N-I	NS	NS	NS
26	ND	ND	ND	ND	ND	ND	ND	ND	N-I	7.2	NS	NS
27	ND	ND	ND	ND	ND	ND	ND	ND	N-I	7.0	NS	NS
28	ND	ND	ND	ND	ND	ND	ND	.03	N-I	6.8	NS	NS
29	ND	.4	.07	2.0	ND	ND	ND	ND	I60	6.6	10	0.7
30	ND	ND	ND	ND	ND	ND	ND	ND	N-I	6.8	NS	NS
31	ND	ND	ND	ND	ND	ND	ND	ND	N-I	6.7	NS	NS
32	ND	.4	ND	ND	1.9	ND	ND	ND	I35	3.3	+	NS
33	ND	0.5	0.14	0.4	0.61	.003	.05	ND	I60	6.4	+	0.4
34	ND	0.9	0.2	ND	ND	ND	ND	ND	N-I	7.7	NS	NS
35	ND	0.4	ND	ND	.92	ND	ND	.02	I46	6.6	+	NS

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OIL/WATER SEPARATOR RESULTS (CONTINUED)

Characteristic Hazardous Waste Analysis

	EP TOX mg/L								DRGC	pH	CN	S
Site #	As	Ba	Cd	Cr	Pb	Hg	Ag	Se	Ig.	Cor.	Reac.	
36	ND	0.4	.16	ND	ND	ND	ND	ND	N-I	7.5	11	NS
37	.02	0.6	ND	ND	.08	ND	ND	ND	N-I	8.8	NS	NS
38	ND	1.5	.08	ND	.70	ND	ND	ND	N-I	8.0	170	NS
39	ND	0.4	.03	ND	.1	ND	ND	ND	N-I	7.3	18	NS
40	ND	0.3	ND	ND	ND	ND	ND	ND	N-I	7.2	NS	NS
41	ND	0.4	ND	ND	8.0*	ND	ND	ND	I-R	4.6	+	NS

Notes: * Indicates value exceeded 40 CFR 261.24
+ Indicates sample was not run due to its volatile nature (petroleum base)
NS is not significant
ND is not detected

OIL/WATER SEPARATOR CHEMICAL PARAMETERS RESULTS

Site Number

Parameter (ug/L)	12	13	14	15	16	17	18	19	20
TOC(mg/L)	400	900	38	78	8400	71	390	840	120
COD (mg/l)	1400	3500	2500	2500	900K	300	400	31K	140K
O&G$	1500	390	3.0	16	4900	250	4400	52	#
TEH*	680	13	1.0	9.9	1800	10	1000	14	#
Phenols	200	3500	110	290	#	20	80	4700	100
As	<100	<100	<100	<100	<100	<100	<100	<100	390
Cd	51	<10	13	15	1100	<10	<10	120	150
Cr	200	56	<50	<50	2500	<50	170	2800	440
Cu	1800	340	78	<20	16000	<20	281	51	350
Pb	1600	2300	<50	<50	43000	220	1200	150	4000
Hg	4	<1	<1	<1	#	1	2	<1	<1
Ni	500	<50	<50	<50	870	<50	<50	<50	350
Se	<100	<100	<100	110	<100	<100	<100	<100	<100
Ag	<50	<50	<50	<50	<50	<50	<50	<50	<50
Zn	5500	1700	190	<50	2500	1100	1900	620	4600
Sb	<100	<100	<10	<10	<100	<100	<100	<100	<100
Be	<10	<10	<10	<10	<10	<10	<10	<10	<10
Tl	<100	<100	<100	<100	<100	<100	<100	<100	<100
S.C.	660	1300	550	990	660	550	2900	1500	440
MBAS (mg/L)	20.	69	2.0	0.8	11	1.8	7.2	160	0.4
Sulfides	60	<1	8	8	16	8	<1	24	12

$ O&G- Oil and Grease (mg/L)
*TEH - Total Extractable Hydrocarbons (mg/L)
@ S. C. - Specific Conductance (umhos)
# Data not reported because of interferences

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OIL/WATER SEPARATOR CHEMICAL PARAMETERS RESULTS (Continued)

Parameter (ug/L)	Site Number 21	22	23	24	25	26	27	28	29
TOC (mg/L)	560	580	850	300	120	22	24	89	450
COD (mg/l)	11K	35K	15K	30K	90K	600		145K	90K
O&G$	5900	35000	#	8300	600	38	30	#	38
TEH*	560	15000	#	3200	340	13	23	#	23
Phenols	160	26000	#	73000	51000	34	170	160	3500
As	<100	<100	<100	<100	<100	<100	<100	<100	<100
Cd	1300	3100	50000	130	81	<10	10	91	<10
Cr	1100	9600	100000	620	280	<50	76	180	370
Cu	1800	560	13000	20	<20	27	92	660	160
Pb	1700	6700	120000	400	200	<50	210	<50	<50
Hg	<1	1	130	2	<1	<1	8	<1	9
Ni	890	72	2000	<50	<50	<50	<50	75	110
Se	<100	<100	<100	<100	<100	<100	<100	<100	<100
Ag	<50	<50	<50	<50	<50	<50	<50	130	62
Zn	2100	4600	150000	350	470	170	1100	1300	2000
Sb	<100	<100	<100	<100	<100	<10	<10	<10	<10
Be	<10	<10	<10	<10	<10	<10	<10	<10	<10
Tl	<100	<100	<100	<100	<100	<100	<100	<100	<100
S.C.	440	550	660	550	550	410	440	360	440
MBAS(mg/L)	6.0	0.2	<0.1	0.2	<0.1	0.2	0.4	8.4	13
Sulfides	4	<1	64	12	20	8	12	4	4

$ O&G- Oil and Grease (mg/L)
*TEH - Total Extractable Hydrocarbons (mg/L)
? S.C. - Specific Conductance (umhos)
Data not reported because of interferences

OIL/WATER SEPARATOR CHEMICAL PARAMETERS RESULTS (Continued)

Parameter (ug/L)	Site Number 30	31	32	33	34	35	36	37	38
TOC (mg/L)	55	75	3700	13000	180	2200	620	13	650
COD (mg/l)	1000	800	130K		1000	25K	3000	300	780
O&G$	410	1000	#	#	78	13	7.1	35	16
TEH*	24	640	#	#	56	12	<0.5	22	2.4
Phenols	4700	87	#	9500	48	42000	100	16	810
As	<100	<100	200	140	<100	<100	<100	<100	<100
Cd	27	21	<10	340	11	120	230	<10	110
Cr	160	<50	<50	1100	110	240	75	<50	82
Cu	180	38	330	260	85	170	540	<20	290
Pb	150	<50	75	640	250	430	79	85	1200
Hg	2	<1	<1	<1	<1	<1	<1	<1	2
Ni	<50	<50	160	560	57	<50	110	<50	<50
Se	<100	<100	<100	<100	<100	<100	<100	190	<100
Ag	<50	<50	<50	66	<50	<50	<50	<50	<50
Zn	220	420	200	830	1300	7900	170	150	500
Sb	<10	<10	<10	<10	<10	<10	<10	<10	260
Be	<10	<10	<10	<10	<10	<10	<10	<10	<10
Tl	<100	<100	360	230	<100	160	<100	<100	<100
S.C.@	410	510	#	1400	660	<1	1100	14000	530
MBAS(mg/L)	4.8	0.7	#	#	1.2	1.4	49	0.5	68
Sulfides	20	4	#	80	24	28	#	<1	4

$ O&G- Oil and Grease (mg/L)
*TEH - Total Extractable Hydrocarbons (mg/L)
@ S.C. - Specific Conductance (umhos)
# Data not reported because of interferences

OIL/WATER SEPARATOR CHEMICAL PARAMETERS RESULTS (Continued)

Parameter (ug/L)	Site Number 39	40	41
TOC (mg/L)	200	5	7000
COD (mg/l)	5000	120	1000K
O&G$	46	500	#
TEH*	15	430	#
Phenols	160	69	#
As	<100	<100	<100
Cd	110	<10	<10
Cr	170	<50	<50
Cu	190	<20	160
Pb	1100	<50	4900
Hg	8	<1	<1
Ni	<50	<50	57
Se	<100	210	<100
Ag	<50	<50	<50
Zn	2200	90	150
Sb	<10	<10	<10
Be	<10	<10	<10
Tl	<100	<100	<100
S.C.@	680	360	<1
MBAS(mg/L)	49	0.4	#
Sulfides	4	8	#

$ O&G- Oil and Grease (mg/L)
*TEH - Total Extractable Hydrocarbons (mg/L)
@ S.C. - Specific Conductance (umhos)
# Data not reported because of interferences

DATA FROM BIO-OXIDATION UNITS

October 7-21 86

Washrack Wastewater Characterization:

pH:	8.0
Alkalinity:	160 mg/l as $CaCO_3$
TSS:	334 mg/l
COD(total)	6200 mg/l
BOD5	1020 mg/l
Cr+6	0.085 mg/l
VSS	322 mg/l
MBAS	1.8 mg/l
Oils&Grease	10.8 mg/l

Reactor and Effluent Data:
Reactor 1 contains 10% washrack effluent
Reactor 2 contains 100% primary clarified effluent

		No. 1		No. 2	
		Feed	Effluent	Feed	Effluent
	pH	7.9	7.9	7.9	7.9
mg/l	Alkalinity	1910	2411	1980	2435
mg/l	TSS	3100	17.9	2490	27.3
mg/l	COD (total)	947	133	363	97
mg/l	Cr+6	0.044	0.0	0.044	0.0
mg/l	Cr (total)	0.112	0.045	0.115	0.030
mg/l	VSS	1618	13.0	1778	14.5
mg/l	BOD5 (total)	254	21.1	162	30.4

28 Oct - 10 Nov 86

Corrosion Control Wastewater Characterization

pH	7.1
Alkalinity	418 mg/l as $CaCo_3$
TSS	1800 mg/l
VSS	1800 mg/l
COD	2460 mg/l
BOD	102 mg/l
Cr^{+6}	0.4 mg/l
Total Cr	0.4 mg/l
MBAS/Oils & Grease	66.0 mg/l

GT-A12

REACTOR AND EFFLUENT DATA
REACTOR 1 CONTAINS 10% WASHRACK EFFLUENT
REACTOR 2 CONTAINS 100% PRIMARY CLARIFIED EFFLUENT

		No. 1		No. 2	
		Feed	Effluent	Feed	Effluent
	pH	7.8	7.8	7.8	7.8
mg/l	Alkalinity	1569	1443	1573	1344
mg/l	TSS 248		10	75	26
mg/l	COD(Soluble)	330	48	200	34
mg/l	COD(Total)	561	56	350	81
mg/l	Cr^{+6}	0.26	0.11	0.24	0.16
	BOD_5(Total)	210	79	210	30
	MBAS	8.2	0.3	1.8	0.3

WASTE DISPOSAL PRACTICES BY SHOP

BUILDING NUMBER	SHOP	TYPES OF CHEMICALS DISPOSED OF BY SHOP	DISPOSAL METHOD
18	831st AUTO HOBBY SHOP	ANTI-FREEZE	D
		PD-680	D
		PAINT WASTES AND THINNERS	D
		AIRCRAFT CLEANING COMPOUND	DD
		BRAKE FLUIDS	D
		BATTERY ACIDS	NDD
350	831st CSG BASE PHOTO	DEVELOPER (CHEMICALS)	SRDD
513	831st CE ENTOMOLOGY	PESTICIDES	CIP
536	831st SUPPLY FUELS	JP-4	RFT
		JP-5	RFT
		CLEANING COMPOUND	DD
540	831st POWER PRODUCTION	GENERAL PURPOSE SOAPS	DD
		PAINT WASTE AND THINNER	D
		BATTERY ACID	NDD
		HYDRAULIC FLUIDS	D
		ANTI-FREEZE	D
		MO-GAS	RFT,FTP
		WASTE OILS	D
551	831st SUPPLY FUELS LAB	PETROLEUM ETHER	CIP
		JP-4	CIP
		JP-5	CIP
		POTASSIUM DICH	CIP
		ISOPROPYL ALCOHOL	CIP
		SULFURIC ACID	CIP
550	831st TRANS MAINTENANCE	TRANSMISSION FLUID	D
		PAINT WASTES AND THINNERS	D
		WASTE OIL	D
		ANTI-FREEZE	D
		AIRCRAFT SOAP	DD
		BRAKE FLUIDS	D
		BATTERY ACIDS	NDD
555	831st TRANS ALLIED TRADES	PAINT WASTE AND THINNERS	D
		WASTE OILS	D
		AIRCRAFT SOAP	DD
		ENGINE DEGREASER	DD
555	831st TRANS GENERAL PURPOSE	AIRCRAFT SOAP	DD
		PAINT WASTE AND THINNERS	D
		ANTI-FREEZE	D
		WASTE OILS	D
		PD-680	D
		ENGINE DEGREASER	DD

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WASTE DISPOSAL PRACTICES BY SHOP (Continued)

BUILDING NUMBER	SHOP	TYPES OF CHEMICALS DISPOSED OF BY SHOP	DISPOSAL METHOD
555	831st SPECIAL PURPOSE	PAINT WASTE AND THINNERS	D
		WASTE OILS	D
		HYDRAULIC FLUIDS	D
		TRANSMISSION FLUIDS	D
		AIRCRAFT SOAP	DD
		ANTI-FREEZE	D
558	831st VEHICLE OPERATIONS	SOAPS	DD
559	37th EMS ARMAMENT SYSTEMS	WEAPONS OIL	D
		PAINT WASTE AND THINNERS	D
		PD-680	D
		1,1,1 TRICHLOROETHANE	CIP
		CLEANING COMPOUND (FREON)	E
562	35th EMS SURVIVAL EQUIPMENT	SPRAY PAINTS	CIP
		MEK	CIP
		ADHESIVES	CIP
564	NDI	MAGNETIC INSPECT	D
		EMULSIFIER	D,SDD
		WASTE OILS STANDARDS	D
		PENETRANT	D
		FILM DEVELOPER	SRDD
569	831st TRANS BATTERY SHOP & WHEEL AND TIRE	OILS	D
		BATTERY ACID	NDD
652	35th EMS METAL PROCESSING	NONE	CIP
652	35th EMS MACHINE SHOP	CUTTING OIL	CIP
		SOAP	DD
652	35th EMS STRUCTURAL REPAIR	MEK	CIP
652	35th EMS CORROSION CONTROL	PAINT WASTES AND THINERS	D
		AIRCRAFT SOAP	DD
		STRIPING WASTE	KIT,RDD
661	831st CES PAVEMENT AND GROUNDS	NONE	
670	831st CES PAINT SHOP	PAINT WASTE AND THINNERS	D
		ACETONE	D
670	831st CES REFRIGERATION	COIL CLEANER	DD
		ICE MACHINE CLEANER	DD
670	831st CES ELECTRIC SHOP	HYDRAULIC FLUID	CIP
		GENERAL PURPOSE SOAP	DD
670	831st CES PLUMBING SHOP	NONE	

WASTE DISPOSAL PRACTICES BY SHOP (Continued)

BUILDING NUMBER	SHOP	TYPES OF CHEMICALS DISPOSED OF BY SHOP	DISPOSAL METHOD
674	831st CES LIQUID FUELS MAINT	PAINT WASTES AND THINNERS	CIP
		OILS	CIP
676	35th Ch.. .NEUDRAULICS	SOAPS	DD
		HYDRAULIC FLUIDS	D
		PAINT	CIP
		PD-680	D
676	37th EMS WHEEL AND TIRE	PD-680	D
		SOAPS	TOP
676	37th EMS PHASE INSPECTION	HYDRAULIC FLUIDS	D
		WASTE OILS	D
		PAINT WASTES AND THINNERS	D
		SOAPS	DD
682	37th EMS CORROSION CONTROL	PAINT WASTES AND THINNERS	D
		ALODINE	D
		MEK	CIP
		SOAP	DD
682	37th EMS AGE	SOAPS	DD
		WASTE OILS	D
		PAINT WASTES AND THINNERS	D
682	37th EGRESS	WASTE OILS	D
		PAINT WASTE	D
		SOAPS	DD
685A	37th CRS FUEL CELL REPAIR	MEK	CIP
		PD-680	D
		PAINT WASTES AND THINNERS	D
685B	37th CRS FUEL CELL REPAIR	SAME AS 685A	
686	37th CRS ENGINE SHOP	B&B M47	DD
		B&B C717	DD
		HYDRAULIC FLUIDS	D
		1,1,1 TRICHLOROETHANE	D,SDD
		WASTE OILS	D
723	831st FIRE DEPARTMENT	AFFF	CIP,*
		WASTE OILS	D
		ANTI-FREEZE	D
		SOAPS	DD

WASTE DISPOSAL PRACTICES BY SHOP (Continued)

BUILDING NUMBER	SHOP	TYPES OF CHEMICALS DISPOSED OF BY SHOP	DISPOSAL METHOD
756	PHASE INSPECTION	JP-4	RFT,FTP
		PD-680	D
		WASTE OILS	D
		HYDRAULIC FLUIDS	D
		SOAPS	DD
756	35th EMS BASE FLIGHT/ TRANS ALERT	PD-680	D
		SOAPS	DD
		MEK	CIP
		HYDRAULIC FLUIDS	D
		WASTE OILS	D
		JP-4	RFT,FTP
		PAINT STRIPPERS	RDD
756	35th EMS EGRESS	SOAPS	DD
		PD-680	D
		PAINT STRIPPER	RDD
		PAINT WASTES	D
756	27th TASS CORROSION CONTROL	MEK	CIP
		PAINT WASTES AND THINNERS	D
		SOAPS	DD
756	ACCESSORIES	HYDRAULIC FLUIDS	D
756	27th TASS STRUCTURAL REPAIR	NONE	CIP
761	144TH FIW/ANG	WASTE OILS	D
		PD-680	D
		SOAPS	DD
		PAINT WASTES AND THINNERS	D
780	35th EMS ARMAMENT SYSTEMS	PAINT WASTES AND THINNERS	D
		WASTE OILS	D
		FREON	E
		PD-680	D
		1,1,1 TRICHLOROETHANE	E
785	20th CMV MISSLE MAINTENANCE	PAINT WASTES AND THINNERS	D
		PAINT STRIPPER	RDD
789	27th TASS AGE	PAINT WASTE AND THINNERS	D
		SOAPS	DD
		WASTE OILS	D
		PD-680	D
		BATTERY ACIDS	NDD

D - DRUMMED
E - EVAPORATED
RFT - RETURNED TO FUEL TANKS
SDD - SMALL AMOUNTS GOES DOWN DRAIN
CIP - CONSUMED IN PROCESS
TOP - THROWN ON PAVEMENT
SRDD - SEND THROUGH SILVER RECOVER UNIT AND PLACED DOWN DRAIN
* - WHILE WE WERE THERE, 5 GALLONS OF AFFF ENTERED THE SEWER SYSTEM

DD - DOWN DRAIN
NDD - NEUTRALIZED AND PLACED DOWN DRAIN
FTP - SENT TO FIRE TRAINING PIT
RDD - RINSED DOWN DRAIN
KIT - KEPT IN TANK

TYPES OF STRIPPERS USED AT GAFB AND LOCATION OF USAGE

SHOP NAME	BUILDING NUMBER	STRIPPER NSN	General Name	Amount used during visit
35th EMS Corrosion Control	652	8010-00-115-3305	Paint Stripper	none
		8010-01-040-1059	Paint Stripper	none
		6850-00-F00-1079	Paint Stripper	none
37th EMS Corrosion Control	682	8010-00-348-7716	Epoxy Stripper	1 qt.
35th EMS Base Flight Trans	756	8010-00-160-5800	Paint Stripper	none
35th EMS Egress	756	8010-00-160-5800	Paint Stripper	none
27th TASS Corros Ctrl	756/685c	8010-00-181-5800	Paint Stripper	none
		8010-P00-3683-4812	Paint Stripper	1.5 qt.
20th CMV	785	8010-00-160-5800	Paint Stripper	none

Stripper Contents

Stripper NSN	Stripper Composition
8010-00-160-5800	70-89% Methylene Chloride 5-20% Alcohol
8010-01-040-1059	34% Benzyl Alcohol 25% dipropylene glycol methyl ether 24% Ethanolamine 12% Mineral Oil 2.5% Aromatic polyoxylakalene surfactant
8010-00-348-7716	75% Methylene Chloride 10% Methyl Alcohol 5% Sodium Chromate 1.4% Ammonia (Ammonium Hydroxide)
8010-00-115-3305	23% Monoethonelamine 8% Cyclocheanone 9% Phenol 11% Mineral Oil 27% Ethylene Glycol Monobutyl Ether 22% Cadmium tetra (2-hydroxyethylamine) oxide
8010-P00-3683-4812	CNL
6850-00-F00-1079 (occasionally used)	70-80% Methylene Chloride 1- 5% Ammonium hydroxide 15% soaps and thickeners

CLN- Currently not listed in HMIS.

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DETERGENT USE AT GEORGE DURING THE SURVEY

shop name	building number	soap nsn	amount of soap used during visit (gal)	dilution ration water:soap gal:gal
831st CSG Auto Hobby	18	6850-00-935-0995	0.53	2:1 cup
831 Supply Fuels	536	6850-00-935-0995	1.25	unk
831st CES Power Pro	540	6850-00-935-0995	none used	unk
831st Trans. Maint.	550	6850-00-935-0995	0.50	5:1 cup
831st Fuel Truck Maint	552	6850-00-292-9700	none used	unk
831st General Purpose	555	6850-00-935-0995	0.75	5:0.25
831st Allied Trades	555	6850-00-935-0995	1.5	5:0.25
831st Special Purpose	555	6850-00-935-0995	0.65	5:0.25
831st Vehicle Ops	558	7230-00-527-1207	5.5	15:2 cups
831st Battery shop	569	6850-00-105-3084	none used	unk
831 CE Elec. Shop	670	7930-00-357-7386	none used	unk
35 EMS Washrack		6850-00-935-0995	280	8.5:1
37th Wheel and Tire *	676	no nsn	0.5	5:5 oz
35th CRS Pneudraulics	676	7930-00-357-7386	none used	unk
37th Phase	676	6850-00-935-0995	0.25	20:1
37th EMS Age	682/643	7930-00-889-3479	2	unk
37th Engine Shop	686	6850-01-181-7187	51	unk
37th washrack		6850-00-935-0995	23	unk
831st Fire Dept.	723	7230-00-527-1207	0.5	unk
35th Phase Inspection	756	7930-00-889 (type T)	0.25	unk
35th Egress	756	7230-00-527-1207	none used	unk
27th Corros Ctrl	756/685c	6850-01-184-3182	33	unk
144th ANG	761	6850-00-935-0995	0.5	unk
35 Arments	780	6850-01-184-3182	13.25	unk
27th Age	789	6850-00-935-0995	19.5	39:1

* Note the wheel and tire shops throws soap and water from bucket directly onto the flightline

Atch 15

Soap Composition

6850-00-935-0995 (Eldorado Chem)- 5% Ethylene Glycol Monobutyl Ether
9% Monyl Phenol Polyethylene Glycol
7% Sodium Dodecyl Benzene Sulfonate

> 92% Biodegradabile (according to Scientific Material International Inc.)

6850-01-184-3182 (Eldorado Chem)- 13% Non-ionic Detergent
(Nonyl Phenol Ethylene Oxide
7% Sodium Dodecyl Benzene Sulfonate
80% Water

6850-00-292-9700 (Continental)- 45% Aromatic Petroleum Solvent
10% Amine Compound
7% Surfactants
38% Inerts

7930-00-527-1207 (Carroll Co.) - unk. Sodium Dodecyl Benzene Sulfonate
unk. Nonyl Phenol Ethoxylate
unk. Water

7930-00-357-7386 (Lighthouse) 5.0% Ethylene Glycol Monobutyl Ether
(for the Blind) 1.0% Tetrasodium Ethylenediamine tetraacetate

6850-01-181-7187 (B&B M47) 5.0%- Sodium Hydroxide

7930-00-889-3479 (Carroll Co.) Non Hazardous ingredients

6850-00-753-4998 (B&B C717) used in steam cleaner at Engine Shop
unk. Aromatic Polyaxyalkalene
unk. non-ionic Surface Agent
unk. Aromatic Benzene Sulfonate
pH-12.0

unk. is unkown percentage

OIL AND WATER SEPERATOR CLEANING SCHEDULE

OIL/WATER SEPARATOR NUMBER	84	85												86							
	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8
14												X	X								
18											X										
75											X										
350																					
513																					
538																					
551											X								X		
552			X		X		X		X		X		X		X		X		X		X
555					X			X											X		
557											X										
558																					
559											X										
562																			X		
563			X				X										X				X
564																					
580			X		X		X		X				X		X		X		X		
645											X										
652	X		X		X		X		X				X		X		X		X		X
661																					
668	X		X		X		X		X				X		X		X		X		X
670											X										
676											X										
682	X		X		X		X		X				X		X		X		X		X
683											X										
695	X		X		X		X		X				X		X		X		X		X
686											X										
691											X										
692											X										
708											X										
720											X										
722			X																		
731											X										
734											X										
755											X										
756					X						X										X
761																					
780	X		X		X		X		X				X		X		X		X		X
785			X				X														X
789											X										
809	X		X		X				X				X		X		X		X		X
819	X		X		X		X		X				X		X		X		X		X
832			X				X										X				X
849					X																

Distribution List

	Copies
HQ AFSC/SGPB Andrews AFB DC 20334-5000	1
HQ USAF/SGPA Bolling AFB DC 20332-6188	1
AAMRL/TH Wright Patterson AFB OH 45433-6573	1
HQ TAC/SGPB Langley AFB VA 23665-5001	2
HQ TAC/DEMU Langley AFB VA 23665-5001	2
USAF Regional Medical Center Wiesbaden/SGB APO New York 09220-5300	1
OL AD, USAFOEHL APO San Francisco 96274-5000	1
USAFSAM/TSK Brooks AFB TX 78235-5301	1
Defense Technical Information Center (DTIC) Cameron Station Alexandria VA 22319	2
HQ USAF/LEEV Bolling AFB DC 20330-5000	1
HQ AFESC/RDV Tyndall AFB FL 32403-6001	1
831 CSG/CC George AFB CA 92394-5300	7
USAF Hosp/SGPB George AFB CA 92394-5300	3